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SELECTIONS FROM CRITICAL NOTICES OF THE FIRST EDITION.

The Saturday Review.

"It is not to be denied that the information contained in this work is immense, being derived from an almost infinite variety of sources; and we may add a praise not often deserved amid such a vast accumulation of materials—that of great accuracy. With all its faults, Dr Laycock's treatise is the work of no ordinary man. . . . His *forte* appears to lie, not in abstract reasoning, but in observation; nor does he lack good sense in the application of the latter, when he is fortunate enough to keep clear of theory. And these two things—observation and plain sense—are precisely what pyschology at present needs. Of reasoning we have had enough to drive us mad."

The Critic.

"The talent, the learning, the earnestness, the fairness of Dr Laycock, compels us to speak of him with respect. If we had been reading for information, we should say that from few works have we profited so much as from his. We question not that in these volumes he has made important contributions to physiology and mental pathology; but he has yet to acquire, if ever they can be acquired, the very rudiments of metaphysics."

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"Dr Laycock's book is full of intensely interesting facts, drawn from the latest discoveries in physical and physiological science. It may be read with profit by many who will not concur with all his speculations, or be able to see how his facts support his theory."

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"Such is a very inadequate presentation of Dr Laycock's enlarged and ennobled view of the teleological doctrine: a doctrine which, it appears to us, deserves a far more searching and philosophical discussion than it has yet received. . . . It is evident that the strength of Dr Laycock's philosophical structure is dependent on the validity of the teleological method."

The London (Quarterly) Review.

"It is not every day we meet with broad and free intellects that know how to make Plato and Bacon shake hands, Cudworth and Combe kiss each other, while innate ideas (which Locke is thought to have exploded) walk peaceably the highway, with Christian Theology on the right hand, and Histology on the left. But this large and liberal faculty of appreciation Dr Laycock

possesses in a very high degree; and it is this which, to our mind gives the great charm to his book."

The Literary Gazette.

"Dr Laycock has produced a work which displays much thought and much learning, which is impregnated with a candid and philosophical spirit, which is creditable to the condition of science among us, and which does not exhaust the subject, only because the subject is inexhaustible."

Medical Times and Gazette.

"Dr Laycock's work will be purused with pleasure as well as with profit, and will be accepted as a most able and important contribution to Rational, no less than Psychological, Medicine."

British and Foreign Medico-Chirurgical Review.

"This is a most unequal work, exhibiting both great merits and great defects. Among its merits may be mentioned extreme ingenuity, extensive and accurate information on a great variety of subjects, and above all, the distinct indication of certain paths of inquiry which decidedly lead in the right direction."

The Dublin Quarterly Journal of Medical Science.

"In his preliminary dissertation on Method, with which his work commences, we have a perfect model of pure and classic composition, replete with observations calculated to guide and direct the inquirer in his search after truth, by pointing out the true and legitimate path by which that object is only to be obtained."

Dublin Medical Press.

"Independently of its usefulness, the subject is curious and interesting in the highest degree; there is scarcely a paragraph that does not furnish abundant materials for reflection; and as the author's method involves a vastly comprehensive view of the entire range of life and organisation, and of science, both physiological and metaphysical, the fund of information it contains is extremely rich and varied."

Journal of Psychological Medicine.

"It would be impossible to convey in a brief form a just notice of the final portion of Dr Laycock's work. His examination of the functions, evolutions, and organology of the nervous system, whether it be regarded simply as a summary of our knowledge on these subjects, or on account of its suggestiveness, is in the highest degree interesting. He places the whole of our knowledge in a clearer light and upon a firmer foundation; and his conclusions and suggestions are admirably adapted to facilitate, and to give an additional impetus to, further research."

John L. Sullivan
Malden 1869

MIND AND BRAIN:

OR,

THE CORRELATIONS OF CONSCIOUSNESS AND ORGANISATION;

SYSTEMATICALLY INVESTIGATED AND APPLIED TO

PHILOSOPHY, MENTAL SCIENCE AND PRACTICE.

BY

THOMAS LAYCOCK, M.D., &c., &c.,

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AND LECTURER ON MEDICAL PSYCHOLOGY AND MENTAL DISEASES
IN THE UNIVERSITY OF EDINBURGH, ETC. ETC,

WITH A PRELIMINARY DISSERTATION ON METHOD AND ILLUSTRATIONS OF THE TEXT.

SECOND EDITION.

VOLUME I.

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D. APPLETON AND COMPANY,
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MDCCCLXIX.

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"The true and legitimate goal of the Sciences is none other than this, to endow human life with new discoveries and resources."

BACON, *Novum Organon Aphor.* lxxxi.

EDINBURGH: PRINTED BY NEILL AND COMPANY.

PREFACE TO THE SECOND EDITION.

In preparing this second edition the author has endeavoured to profit by the criticisms bestowed upon the first. Although he cannot concur with them all, he thankfully acknowledges the candour and generosity with which several of his most competent critics have dissented from his views. He has chiefly endeavoured to make the work more complete, by giving a wider application to the great correlative laws of organisation, evolution, and unity; and for this purpose has re-written the exposition of the fundamental laws of life and consciousness contained in chapter xiii. part iii. In the first edition the law of evolution was chiefly applied to psychological and biological facts; in the new chapter it is applied to the correlations of molecular forces, and *vis nervosa* and vital energy are shown to be the result of the evolution, conservation, and accumulation of chemical energy. Chemical affinity is thus differentiated from the other molecular forces as an evolutional and regulative force. This doctrine has enabled the author to give some entirely new views of the relations of chemical and vital changes to the phenomena of memory and thought generally; in short, to show that there is a real correlation between the genesis of

life and of thought, as might be hypothetically deduced by his method.

Usually the theory of evolution is restricted to the ascending and expanding series of vital phenomena, so that, although the author had long taught that there is an equally general inverse law of retrocession or disvolution, he did not venture in the first edition to deviate far from the usual procedure. In this edition he has more definitely exhibited this law as manifested in imperfection, degeneration, disease, and death, and shown some of its applications to practice. In particular, he has indicated the relations of defective brain-nutrition to modifications of the highest intuitions and faculties of the mind.

When rewriting the chapter in the second volume on the cerebrum and cerebellum, in accordance with the same principles, the author found it necessary to abandon certain current and almost stereotyped doctrines as to brain-function; to mark out definite areas of encephalic nutrition and blood-supply; and, in connection therewith, to indicate more definitely the relations of the sympathetic system of the encephalon with corporeal form on the one hand, and mental function on the other. These views are concisely (perhaps too dogmatically) stated, because the illustrative facts are chiefly pathological; nevertheless, the author trusts they may be found useful to both science and practice.

It was suggested to the author that his method and principles might help in some degree to elucidate the fundamental laws which govern the social relations of the sexes, and to indicate how far the or-

ganology of woman determines the education proper to her. He has therefore added a short chapter on manhood and womanhood.

The author's principles and method arise out of that fundamental fact of experience, that every state of consciousness, whatever it be, coincides with molecular changes in the encephalon, without which no change in the consciousness can arise, and which, being vital, are independent of consciousness. Since vital changes take place in a certain order, according to certain laws, the inductive method limits research to the observation of that order, and of the order of the correlative conscious states. Having first promulgated these views in 1839, 1840, 1844, 1845, and from time to time subsequently, he was obliged to take serious notice in the first edition of a claim to priority of promulgation of the doctrine of unconscious cerebral action, set up by Dr Carpenter in 1855. As this question was then discussed historically in an Appendix, which it is not necessary to reprint, the author would only remark now on the great and solid progress which that portion of his doctrines has made since he first promulgated it in England thirty years ago. At first it was ridiculed as a contradiction in terms, and only two eminent but antagonistic workers in the field of mental science recognised its importance. Sir William Hamilton found in the author's doctrine of the reflex function of the brain an explanation of the facts of "latent" consciousness, and George Combe applied it to phrenology. Now few writers on psychology and on mental physiology and pathology fail to apply it to their theories.

The doctrine has, nevertheless, as yet only a restricted application to mental science, and in particular is injuriously mixed up with speculations with which it has no affinity whatever. Its true tendency is to place philosophy on the sure basis of mathematics and physics, by including within the latter the molecular forces in the way indicated in part iii. (on MENTAL DYNAMICS), and thus bringing it into the circle of the inductive sciences. In so far as metaphysicians have noted the order of mental changes so as to be available for comparison with the order of vital changes, their facts are available inductively. And these remarks may serve as an explanation and apology to those readers who, wearied with the interminable discussions of metaphysicians, object to them altogether in a work like this. Mental science cannot afford to lose the great results of speculative thought. Besides, all philosophical systems are in truth physiological facts of no small value, for the fundamental principle of modern mental science being that no change occurs in the consciousness without a corresponding change in the encephalon, every such system, however profound, is the result of brain-work, and must consequently be included in any sufficient theory of brain-function. It is this relation of the organ to the most absolute truths of philosophy, as well as to the profoundest speculations, which renders it the most interesting and important, if not the most wonderful of created things.

EDINBURGH, *5th April* 1869.

PREFACE.

THIRTY years have elapsed since the Author first commenced an inquiry into the relations of Body and Mind, with a view to practical results. After directing his attention for some time to the resources which mental philosophy and cerebral physiology supplied to this end, he came to the conclusion that both, as then received, were alike vitiated, for the purposes of inquiry, by a fundamental defect in method. Neither attempted, nor indeed pretended to attempt, a demonstration of the relations between the laws of functional activity of the organ of consciousness and the laws of consciousness itself. Each department of knowledge was expressly held apart from the other; and their subject-matters of inquiry were considered to be fundamentally distinct.

It is easily seen why this divisive method of inquiry is not applicable to practical ends, either in mental or vital science. Since we have no other sources of knowledge than those which our consciousness affords, and since all our states of consciousness are necessarily coincident with the operations of our vital forces, it follows, that a knowledge of the laws of consciousness, in relation with the laws of the vital forces, must constitute the foundation of all science whatever; or, in other words, that

Metaphysic, to be complete as a unity, must bring within its range the laws of Life and Organisation.

The union of philosophy proper with physiology (or, more correctly, with biology), is, however, more especially necessary, if we would establish an applied science of Mind; for that must be applied to mind active in all the business of human life, whether in the healthy states of which the metaphysician takes exclusive cognisance, or in those morbid states which more especially engage the attention of the physician. In both classes of mental activities, the phenomena of life and consciousness are inseparable; so that, without a scientific correlation of the two classes of laws, an applied science of Mind is not possible.

The validity of these views may, and probably will, be questioned, but they are at least those at which the Author arrived after a diligent trial of the divisive method of philosophising. And he was thus led to attempt the application of the correlative method to an elucidation of the nature and treatment of insanity, and of the physiology of those peculiar mental states which, under the popular names of Mesmerism, Electro-biology, Spirit-rapping, and Spiritualism, have each in their turn attracted so much of the public attention throughout the civilised world during the last quarter of a century. Although the practical results the Author has thus attained have not been wholly withheld from the public, yet they have been made known only partially as a portion of his academic courses, or through the press in a desultory way, in illustration of practical points in treatment; while the method itself, and its modes of application, have never been stated.

This proceeding was partly due to a disinclination on his part to grapple with such an all-comprehending subject, until some of the departments of physiology were more advanced, and the public mind more convinced of its fundamental importance; mainly to a hope that delay would not only enable him to develop his views, but also afford the leisure necessary to the proper exposition of a new system, and of the facts upon which it must be based.

The latter expectation, at least, has not been fulfilled. Every year brought its own pressing duties, and it was not until the Author was required to deliver a course of lectures on Medical Psychology, in the University of Edinburgh, that he made an effort to systematise the results of his labours. An urgent need was at once felt for an introductory exposition of the correlations of physiology and philosophy, according to a method whereby the reciprocal relations of Body and Mind—the subject-matter of medical psychology—could be scientifically and practically determined. The attempt to meet this need has resulted in the present volumes. The work has therefore a twofold object—namely, *first*, as a class-book, to introduce the student of medical psychology to a comprehensive inquiry into the relations of consciousness to organisation; *secondly*, to afford to the general student of mental science, in its practical applications, whatever those may be, a solid foundation for a course of self-culture, in an exposition of the relations of organisation to consciousness.

That a course of medical psychology thus constructed, and a work thus arranged, in adaptation to the wants of both the professional and general student, are amongst

the scientific demands of the age, is manifest from various considerations. The enlightened physician has long been convinced, that a science of Life and Organisation, built up on the solid foundation of a sound mental philosophy, is an essential requisite to the proper development of a science of medicine; without that, the practice of medicine can never be anything more than an art. The advanced metaphysician, impressed by the progress of physiology, is beginning to see that the union of philosophy and physiology is not only possible but necessary; so that some in the first class of modern philosophical inquirers combine them in study and teaching.* The philosophical phrenologist, too, although avowedly physiological, is convinced that he must abandon the empirical method of research, and look more deeply into the correlations of the laws of Life and Thought, if he would advance phrenology to the philosophical and scientific level of the time.

Then, again, the increase of insanity, or at least of the numbers of the insane, and the difficulties thence arising, are exciting a spirit of inquiry as to the best means of treating and preventing that disease. For the public mind in general, ignorant of its nature and causes, vacillates to and fro with a lamentable mutability of purpose;—being now full of sympathy for the insane, and indignant at their detention in safe custody; now horror-struck by some terrible act of insane violence, and indignant that the wretched sufferer should escape the vengeance of the

* My colleagues, the Professors of Moral Philosophy and of Logic and Metaphysics in the University of Edinburgh, both introduce physiology into their courses.

law. And this state of public opinion has influenced so strongly the welfare of families and the administration of justice, that leading minds now see the absolute necessity there is for a science of Mind more available to beneficial legislation on this question than that which the divisive method has hitherto afforded.

A large number of persons of general culture also feel the necessity of some more available general principles than philosophy or physiology affords, and are endeavouring, according to a method of their own, to attain them. Phrenology first made the physiological study of mental science popular; but there arose concurrently with it a variety of methods of experimental research into the laws of action of the brain and nervous system, known as Mesmerism, Electro-biology, and the like, the great object of which is to establish certain mystic theories of life and organisation, and thought. Such is always the first stage of inquiry, when the operation of forces of nature hitherto unknown is discovered. All modern physical philosophy thus arose. What is to be regretted is, that this great truth in the development of science should have failed to impress this class of inquirers; and that, as a consequence, some of the best intellects of the day should have heroically suffered so much in defence of the truth as to fact, and yet have been led away so widely into the false as to theory. In a mental philosophy which takes due cognisance of the laws of Life, will be found the best antidote to this evil. The phenomena of mesmeric and of analogous processes are in truth nothing more than the results of experiments upon the functions of the brain by impressions on the senses. As

such they are invaluable; and when rightly comprehended, under the guidance of the principles of a sound cerebral psychology, will help to build up a mental science from which all mysticism will be as effectually excluded as it now is from physical science.

Further, natural history, zoology, and ethnology, are raising questions which it is the proper business of philosophy to solve. What, it is asked, is the difference between reason and instinct? Where are the limits of animal and vegetable life? What is the origin of living things, in all their infinite variety? How came the animal Man upon the earth? What makes men to differ as to race, form, and mental qualities? Science having subdued the physical forces of matter to man's uses, and made them his servants and swift messengers, is now vigorously pushing its efforts in the direction of the vital forces, so that they too may be brought under control.

While the zoologist and physicist are thus extending their sphere of research, the political economist and ethical philosopher are equally busy with inquiries into the development of the human faculties, with a view to education; and with the laws of social organisation, as the foundation of a science of Sociology. And thus, from every quarter, the science of human nature is tending to unity, in a system of philosophy which shall have for its foundation the great correlations of the laws of organisation and consciousness.

Such, then, being the scope and extent of modern research, and such the objects which various classes of inquirers are pursuing, it became necessary so to set forth the correlative method that on the one hand it would

serve to establish this unity of human knowledge, and on the other be available in its various subordinate departments. And here, at the outset, a great difficulty arose; for the qualifications, predilections, and attainments of the persons interested, are so different and diverse, that it seemed almost impossible to sketch a plan which would meet the requirements of all. It seemed, however, to the Author, that the natural development of the subject was most likely to be in accordance with the needs of the greater number of inquirers. He has therefore sketched a method, and carried it out into the formation of a body of doctrines, in such a way that the reader, if an earnest student, may have a guide through the multitudinous phenomena he has to examine and compare, in his scientific progress from the known to the unknown.

In accordance with these views, the First Part of the work sets forth the necessary connection between Physiology and Mental Philosophy; states the objects which a correlative method of inquiry should aim at; and inquires into the obstacles to scientific progress which have arisen out of the divisive method. In these chapters the same idea is necessarily examined under various aspects; and therefore the style has a tautological character, which would have been avoided if that had been possible. The method proper is then developed; and while it is shown how a teleological unity may be attained, it is also established as a fundamental principle, that any practical science of Mind must be founded on, and be tested by, the common sense and experience of mankind.

In the Second Part, the results of that experience, and

the general doctrines reached by speculation and the divisive method, are systematically summarised, so as to constitute them the platform for the scientific portion of the inquiry. Much of this Part must necessarily be familiar to the philosophical reader, and might therefore have been omitted, so far as he is concerned. Such a summary seemed to be necessary, however, for that large class of students who have little time or taste for the study of metaphysics.

The Third Part is that which commences the scientific portion of the work; it is occupied with the causes of Life and Consciousness. Of late years science has developed the unity of the physical forces, and reduced them to a general law of transference of force; the correlations of the physical and vital forces in this respect have also been marked out. But no one has shown how forces are transferred so as to attain the ends which are observed to be attained by the operation of the vital forces; nor has any one attempted to throw a scientific bridge across the impassable gulf which has hitherto appeared to separate the phenomena of life and organisation and of thought. Now, the Author has aimed to overcome this difficulty by a new and very simple method, and one perfectly available, as he believes, for all purposes of inquiry. Looking at the two classes of phenomena, and examining what they have in common, this principle is deduced — viz., That whereas Mind designs, Life is designed. Design, therefore, is common to both; but in the one there is a conscious energy of design, in the other an unconscious. And this further law of correlation is universally manifest—viz., That the

results of the vital forces, operative according to a law of design, coincide with the various states of consciousness known as desires, feelings, and the like. Hence a general law of design, with its derivative laws, correlates both the laws of life and of consciousness.

In the Third Part, the principles of Teleology, or Mental Dynamics, are developed from this law of design, and ideas are considered as causes not only of life and thought, but of all the phenomena of creation. It is this part of the work which will probably attract more critical attention than others. The Author would therefore state here, that the views therein developed are intended to be wholly scientific. Mind is simply considered as an ordering force in creation, to be examined according to the usual method of scientific research; that is to say, as it is manifested in the sequences and co-existences of phenomena. There is no discussion as to the nature of soul, mind, or spirit, such as is found in psychological works generally; and thus the phenomena are examined wholly apart from those philosophical and theological speculations which are altogether foreign to science. In introducing, therefore, so much of these speculations as is to be found in this Part, the Author had solely in view the restriction of the inquiry within its proper limits.

Having thus established a system of general principles, the Author proceeds to apply them in succession to the general laws of Life and Organisation, or Biology; to the development of a scientific Cerebral Psychology; and to the first principles of a Mental Physiology and Organology. By this method the reader is thus first led up to the great general laws of all phenomena over which

mind, considered as an ordering force, dominates; and thence downwards, through the great laws of archetypal development and physiological change, to the derivative, special, and ever-varying phenomena of consciousness and life. In examining the latter, the Author has more fully developed that great law of unconscious functional activity of the brain as the organ of consciousness—which he was the first to demonstrate.* Although it is a law without which no physiological explanation of the phenomena of consciousness is possible, yet it is more especially applicable to the phenomena of latent consciousness.

The reader is led through a great variety of speculative and scientific inquiries; but in every stage the Author has kept in view either the solution of practical questions, or the suggestion of new methods of inquiry and of new principles by which that solution may be reached. If the work, embracing so wide a range of phenomena, appears too extended, the Author would explain that he has endeavoured to condense it within the smallest possible compass; and to this end, in the evolution of great laws, he has rather indicated their application to phenomena than illustrated them. As, however, the reader descends more and more from the general to the special, he will find the practical illustrations more and more developed. But even here, with a view to the economy of space, the Author has ventured to refer frequently to his published practical papers, rather than to extend the work by details. For the same reason he has avoided reference to numerous writers on the subjects discussed, and selected only a few of many leading names. Thus, in the department of metaphysics,

* See APPENDIX.

he has quoted principally from leaders of diverse though not wholly conflicting schools—viz., Kant, Reid, Hamilton, Ferrier, Whewell, and J. S. Mill.

The entire scope of the work is to carry up the doctrine of final causes, in a connected form, to its highest uses; and to show that Mind is the final cause, as an ordering force, of all the physical forces, and of all their derivative manifestations in the phenomena of creation. Under the guidance of this principle, that union of the two great departments of human knowledge, hitherto so sedulously kept apart, is attained. Thus, the work, it is hoped, may serve to advance both; for on the one hand, the phenomena of Life and Organisation are brought into the domain of Philosophy; on the other, the phenomena of Thought are brought into the domain of Physiology. The unifying principle, that mind is dominant over matter and its forces, enables us to compare and generalize phenomena hitherto considered wholly discordant, so as to harmonise them, and thereby to break through that eternal maze of contradictions, as to reason and instinct, consciousness and unconsciousness, life and intelligence, within which all philosophical inquiry has been so long involved. By adding physiology to philosophy, we place philosophy at the head of the inductive sciences, and at the same time bring all the sciences of Life and Organisation into philosophical relation and unity. The basis of this unity is Teleology, applied deductively and inductively to all the phenomena which science investigates.

Warned by the failure of all preceding attempts to establish a new philosophical method, the Author does not

venture to offer an opinion how far this effort is likely to be acceptable. He may, however, be permitted to express a hope that it will be considered at least a step onwards, and that, by its aid, the practical results to which it has led him may be largely added to by others. He cannot doubt that the student of human nature, whether he be physician or metaphysician, will find much to interest him in the generalisations which bring instinct and reason into the same category; and that the principles by which the laws of Life and Development are brought into correlation with the laws of Thought, will not fail to offer materials for suggestive thought on fundamental questions of biology and palæontology to the naturalist, physiologist, and philosophical zoologist, although he may not be ready to concede the validity of either the method or the doctrines.

The Author hopes, too, that the general laws of Life and Thought which he has evolved will be found available to a more scientific art of Medicine; and, in particular, to an explanation and elucidation of the nature and management of the various morbid states generalised as mental diseases, and of those not less irregular conditions of the mental functions which have proved the source of so much serious error as to the reciprocal relations of Body and Mind. He reserves for some future occasion an exposition of the more special applications of his principles to this and the other departments of Practical Medicine.

Rutland Street, Edinburgh,
16*th April* 1860.

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ERRATA. Vol. I.

Page 62, line 6 from bottom ; *for* lie, *read* life.
,, 120, ,, 2 from top; *for* anthropomorphitic, *read* anthropomorphous.
,, 241, ,, 1 from top; and 245, line 13 from bottom ; *for* Boscovitch, *read* Boscovich.
,, 243, ,, 8, § 117 ; *for* Helmhotz, *read* Helmholtz.
,, 314, ,, 6 from top ; *for* Puntheism, *read* Pantheism.

PART I.

PRELIMINARY DISSERTATION ON METHOD.

CHAPTER I.

ON THE NECESSARY CONNECTION OF A PHYSIOLOGY OF THE BRAIN WITH A PRACTICAL SCIENCE OF MIND.

"ON EARTH THERE IS NOTHING GREAT BUT MAN; IN MAN THERE IS NOTHING GREAT BUT MIND." Such are the words which the late Sir William Hamilton has left inscribed upon the wall of the class-room of Logic and Metaphysics in the University of Edinburgh. If they express a true conception of the human mind, then we cannot too highly estimate the importance of that living organ by which it is manifested and energizes, and which is known as the Brain. As a being, man is constituted, like all other animals, of an exquisitely constructed series of machinery, each so admirably adapted to the other that they work together to the best results; as a rational being he thinks, and feels, and wills in and by a special apparatus—the nervous system—of which the chiefest portion is the encephalon, or that contained within his skull. All his desires and motives are experienced in and act upon this important apparatus—and all are expressed by it; so that what the man is, in character and conduct, is the expression of the functions of this nervous system.

To understand, therefore, the laws and modes of existence of man as a rational being,—how he may be perfected, and how his wants may be best determined and fulfilled,—it is necessary to know, not only how the encephalon is constructed mechanically, and how it acts dynamically, but under what conditions it is constructed, and according to what laws it is operative. Or, in other words, the laws of development and organisation of the encephalon, as the necessary instrument and seat of man's energies and feelings, must be determined, if we would rightly understand its mechanism and modes of activity, under varying states of the consciousness, in various races, nations, societies, individuals. The vital processes and the correlative mental states of each moment are linked to a series of similar changes, of which they are logically the necessary results, extending far back into time. This long series of activities—vital and mental—continuing through a succession of individual men, from generation to generation, corresponds, in cerebral physiology and psychology, to that long succession of forms of organisms which, commencing in the abysses of time, are the subject-matter of palæontology; so that, just as the last individual of a species is but the latent expression or manifestation of a long series of cycles of changes in the species, so the last thoughts, and feelings, and actions of an individual man are but the result of a series of changes dating far back in his own individual history, or having their roots in the modes of mental and vital activity of his ancestry.

Now, it is undeniably true, that throughout these cycles of vital changes there is an immanent, inherent Energy ever operative, which is not a mere physical or material agent, and which can only be conceived as an actively adapting force manifested in the phenomena of life; consequently, its laws and modes of operation can

only be determined by determining the laws of development and organisation and of mechanical structure and dynamical action of the living structures by which it is manifested. If it be inoperative, it is unknowable. Hence, mind and its laws can only be known through the phenomena of life and its laws. And since the phenomena of human consciousness are biologically a special form of manifestation of vital processes, which have their seat and origin in the encephalon, the laws of thought, and will, and feeling, can only be fully determined for practical uses in correlation with the laws of action of the nervous system, of which the encephalon is the chiefest portion and the highest development. It follows, therefore, from these considerations, that the brain and nervous system are the proper subject-matter of a true science of mind—without a knowledge of which there can be no such science whatever, in the proper sense of the term. It equally results, that its study as an applied science can only be followed according to the method pursued in the study and application of the other applied sciences. The practical psychologist is an artist: as such he must be familiar both with the principles and the subject-matter of his art. Mere reading and reflection cannot, therefore, serve to make a man a practical psychologist any more than they would serve to make him a physician, mathematician, chemist, musician, navigator. In practical psychology (as in all other applied sciences) there must be an accurate apprehension of the broad general truths of the science; then an accurate and extended experience of its subject-matter, which is man as he exists under varying conditions—the experience being enlightened by the knowledge of these general truths, and corrected by the familiar application of them in the concerns of daily life. Mental science is the chemistry of human nature.

Its principles, and its methods of observation and inquiry may be taught in the class-room; its practical uses, its analyses and manipulations, must be learned and practised in the great laboratory of the world, by each man in his own sphere of action. But, under all circumstances, and amidst all conditions, the phenomena to be finally examined are the phenomena of life and organisation, manifested in the brain and nervous system, and of which the physiology of the brain, considered as the organ of mind, takes scientific cognisance.

Hence the student of mental science, if he would be a successful student, must concentrate his researches upon the laws of action of the brain and nervous system, as they correlate the laws of thought and volition, and must eschew all efforts to develop it by simple meditation on his own states of consciousness, or by the processes of logical art, to the exclusion of observation and experimental research on the subject-matter of his science. "No one," Kant observes, "by means of logic alone can venture to predicate anything of or decide concerning, objects, unless he has obtained, independently of logic, well-grounded information about them."* And he adds, as a safe and useful warning, that general logic, considered as an organon, must always be a logic of illusion; and that any attempt to use it as an instrument, in order to extend and enlarge the range of our knowledge, must end in prating; any one being able to maintain or oppose, with some appearance of truth, any single assertion whatever.

Nevertheless, a knowledge of true logic and metaphysics is of as great importance in scientific research, as of close and accurate observation of phenomena. There can

* *Kritik der Rein: Vernunft.* Introduction.

be no observation without thought about the thing observed, and no right or useful thought without that discipline of the mind which a knowledge of true logic and metaphysics implies. Undoubtedly they have been either wholly neglected, or treated as of secondary importance, by many modern inquirers ; but it will be found, on examination, that these persons have fallen into errors which the knowledge they despised would have enabled them to avoid, or have been less successful than they otherwise would have been ; or, from a natural defect in the constitution of their minds, have not been able to perceive the true uses and applications of logic and metaphysics in inductive research. The most successful inquirers have usually been good metaphysicians.*

The knowledge of such general laws is not in itself of difficult attainment ; the real difficulties arise from the obstacles which faulty methods and preconceived prejudices throw in the way of a true method. If these obstacles be happily surmounted, and a right method adopted and prosecuted with steady industry, it will be found that the study of mental science is not only the most generally useful and

* "That process which is here termed metaphysical—the analysis of our conceptions and the experience of their inconsistencies (accompanied with the study of facts)—has always gone on most actively in the most prosperous periods of each science. There is in Galileo, Kepler, Gassendi, and the other fathers of mechanical philosophy, as much of *metaphysics* as in their adversaries. The main difference is, that the metaphysics is of a better kind ; it is more conformable to metaphysical truth. And the same is the case in other sciences. Nor can it be otherwise. For all truth, before it can be consistent with *facts*, must be consistent with *itself*. . . . It would be easy to adduce, from the works of all great discoverers, passages more profoundly metaphysical than any which are to be found in the pages of barren *à priori* reasoners."—Dr Whewell. *Novum Organum Renovatum*, 3d ed. 1858, book 3, chap. iv., § 5.

the most attractive of all scientific pursuits, but also, that the science itself is as easy of acquirement, and much more within the reach of the general public, than those which require elaborate apparatus for their successful prosecution. For the student of mental science has, in the phenomena of his own consciousness, both the means and the matter of observation ;—his own brain is an instrument which, if rightly used, exceeds all other instrumental aids to research whatever. By it he is brought, in truth, into direct and immediate relation with those forces of matter upon which all vital phenomena depend. And if it be necessary to connect those phenomena with the structure and functions of organisms, modern physiology, in all its departments, presents him with an extent of knowledge on this point so great, that, as compared with it, the physiology of Plato was not so advanced as the vague knowledge of most intelligent persons of modern times. Nay, children in our ragged schools in Edinburgh, at least, are more advanced in this respect than the wisest of the ancients.

It must not be forgotten, however, that discipline and a method should be mainly directed to acquiring and applying a knowledge of the physiology of the brain, if the object aimed at be to develop a practical science of mind. 1. The student, to this end, must be ever on the watch to counteract the insidious operation of preconceived notions and prejudices, as the most important of the obstacles to a proper knowledge of the nature of his instrument. 2. He must thoroughly satisfy himself of the inestimable importance of the science itself, as that the final object of which is to enable him to know and exercise dominion over himself and others. With such convictions he will not readily be persuaded that he need give less time and labour to the knowledge of his own nature than he is

prepared to devote to any other branch of science; while he is ready to devote years to mathematics, languages, and the like, with a conviction that earnest toil is the only means to success, he should be prepared to view mental science in at least a similar light.

It is manifest, also, from these considerations, that the student should be prepared by previous study, and a sufficient mental training, for the task before him. Thus, since he has to combine physiology and philosophy to practical ends, a competent knowledge of the two great departments of knowledge should be an object of necessary attainment. But by a competent knowledge of philosophy I do not mean more than may be acquired by the careful study of two or three standard works on psychology and metaphysics, together with a fair knowledge of elementary logic. By a competent knowledge of physiology I mean only a general knowledge of vital structures and functions, as seen in both the animal and vegetable kingdoms. To this end books may help much; but observation and anatomical research by the aid of books, or, better still, a teacher, are absolutely necessary. A certain general knowledge of natural history, including zoology and botany, must be also possessed by the student.

Now, although the student of mental science must needs employ the methods of scientific research in general, the subject-matter of his science is, in its relation to himself, wholly different from the subject-matter of other sciences. The very thing he has to examine is that by which he examines; the organ whose laws and processes he has to determine is that by which he is enabled to observe and conclude. His brain is both the object and instrument of his researches. Hence all the aims and methods of mental science have a twofold relation to the brain

and nervous system: firstly, as an instrument of research; secondly, as the instrument of relation whereby the man is brought as a rational being into connection with the external world, and the exponent of all those desires and motives which make him what he is. It is this twofold relation which has made the study of mental science so difficult, in so much as the two classes of phenomena are inextricably intermingled; and it is thus that many have been led to the opinion that mental science must necessarily be always too imperfect for any uses as an applied science; that the phenomena it investigates are far too obscure and complex to be brought under general principles, or, if brought under such principles, that they are far too profound and too general for application to the multitudinous and infinitely varying changes in the minds of men—or, at least, that common minds can never grasp them for daily use. This doctrine is undeniably true of those *à priori* principles which a one-sided philosophy offers us as the results of meditation and the logical art, to the exclusion of observation and experience of the subject-matter the brain, but undeniably inapplicable to those practical principles which are reached by the twofold method described. It would be strange, indeed, if it were otherwise, and there were no simple and available principles of a science of human nature, when the whole fabric of human society is held together by the operation of those principles, and when every man, woman, and child in it is of necessity, and instinctively, a practical psychologist. For surely (to mention but one illustration) that estimate of a man's character, and of his probable modes of thought and action, which is habitually deduced from the features, gestures, tones of voice, race, language, accent, expression of countenance, and the like, is virtually nothing more than an empirical

psychology, however informal it may be. And when the generalisations which can thus be made respecting the feelings and actions of mankind are reduced to general propositions, they become the empirical laws of a practical science of physiognomy.

Thus prepared, the student will be able to carry on the twofold process of observation and induction already referred to without that complexity and difficulty which is otherwise experienced. All his observations can be arranged, accordingly as they are intended to develop a knowledge of the brain as an instrument of research—*i.e.*, of its physiology proper; or as they are intended to apply to a knowledge of human nature—*i.e.*, as facts of mental science. To both these ends the student can either observe and experiment upon his own states of consciousness in their corporeal relations, or upon those of other living things about him. By the former method he will soon acquire the habit of detecting the necessary relations which corporeal changes, from whatever cause arising, bear to his mental states, and thus gain a large amount of practical self-knowledge; by similar observations on others, he will in like manner gain a large amount of practical knowledge of mankind. Children and the insane are, however, the best subjects for study, but especially children, as the corporeal and mental phenomena they manifest are less complex in them than in adults.

The habits and instincts of the lower animals, whether wild or domestic, including the inhabitants of aviaries, *vivaria*, or *aquaria*, will supply never-failing objects of instruction and interest. The entire insect world is a creation to itself, in which the relations of the law of design to organisation are manifested in every variety of phase, and in which the busy life of mankind, with all its multi-

farious processes and pursuits, is reflected as if it were a mirror. Nor must it be forgotten that the instincts of plants are amenable to the same general laws as those of animals, and that many of these organisms are as susceptible of the action of chloroform, opium, carbonic acid, and other so-called nervine agents, as man himself.

A few weeks or months thus occupied will suffice to form those habits of observation, without which neither the successful study nor the practical application of mental science is possible. Yet I would here venture to add a few words of caution. Although I am anxious to popularize the science of mind, and therefore seek to break down the barriers which have hitherto excluded the great majority of educated men from its pursuit, I only mean it to be popular in the sense of being non-professional, and not popular in the sense of its being a thing easy of acquirement. The student owes scientific labour and serious thought to it as a sacred duty; for without these mental science will degenerate into a superficial, frivolous pretence of knowledge. The true psychologist, therefore, must be ready himself, and demand of others, to submit to discipline; must toil to acquire the necessary preliminary knowledge which may be considered only instrumental, as the anatomy and physiology of the nervous system, and the sciences of life and organisation, so far as regards general principles; must acquire a precision in the use of terms as nearly of mathematical exactness as the ambiguities and imperfections of language will allow, together with that skill in the use of his intellectual powers which a logical training supplies; and finally, he must practise his observing powers in his daily intercourse with man, and not with man alone, but all the living things his fellow-creatures about him, with a special reference to the great object of his studies. Now,

if this list of requirements may appear in imagination so great as to dishearten the inexperienced student, or the man who has been accustomed to limit his investigations to the phenomena of his own consciousness, I would just remark, that the reality is by no means so overwhelming as the imagination. On the contrary, I think that a practical science of human nature may be successfully studied in equal time and with equal ease as most of the higher departments of other sciences, as for example the higher mathematics, physical astronomy, chemistry, engineering physics, and the like, provided always that the same method and the same perseverance be used in acquiring the practical science of human nature as in acquiring them.

CHAPTER II.

ON THE ENDS TO BE ATTAINED BY A SCIENCE OF MIND FOUNDED ON A PHILOSOPHICAL PHYSIOLOGY OF THE BRAIN.

The bearings of a mental science on life and organisation are as important as those of life and organisation on mental science; for if the phenomena of the latter correlate the states of consciousness, the phenomena of consciousness correlate vital states. This conclusion necessarily follows from the fundamental truth in life and thought, that the encephalon is the seat of all the states of consciousness, however intellectual or however animal; and that, consequently, all the motives, desires, and actions of man, however diversified, must finally be associated with the healthy action of the brain, as the organ of all his energies, and the seat of all his feelings. Hence we can, on the one hand, interpret the vital phenomena of which the brain is the seat, by the mental phenomena correlative with them; while, on the other hand, we can determine by observation to what extent, and under what conditions, the latter are modified. Now, the former method is the portion of mental science which determines the laws of mental action in connection with the laws of vital action, or, in other words, develops the physiology of the brain; the latter is that by which the knowledge thus acquired is applied to practical uses. Hence a true physiology of the brain is founded on mental philosophy, in combination with biology; a true mental science is

founded on the physiology of the brain thus educed in combination with mental philosophy. The error in the method hitherto followed has consisted in following each apart from the other. This must have a separate investigation. In the meanwhile, it will be useful to determine what are the ends attainable by a practical science of mind, so that we may fully comprehend the true extent of the basis upon which a philosophical physiology of the brain must rest.

Mental science teaches the laws and modes of existence of man as a rational being; a practical mental science must teach the application of these laws to the wants of man. Philosophy and science are not opposed to each other; they only differ in their capability of application. Philosophy, indeed, in one sense, may be considered as an æsthetic art, being the application of knowledge to pleasurable uses. Strictly, philosophy is the pursuit of truth for its own sake; and in this respect science resembles philosophy. But science also enables man to advance his material happiness and wellbeing, while philosophy only gratifies the thirst for knowledge of the causes of things, which is the first developed and most dominant of his intellectual desires. Curious inquiry into the world within him and about him is one of man's highest enjoyments, wholly irrespective of its uses. He speculates on the nature of God,—the mysteries of his own existence,—the nature and causes of good and evil,—the origin of all that he sees around him. He earnestly seeks after a knowledge of the beginning of creation—of the trees of the forest and the flowers of the plains; of rocks and mountains; of rivers, and the ever-flowing ocean; of the firmament, of the clouds and dew, and of the distant circling stars. Knowledge thus acquired, to these ends, is wisdom or philosophy. Hobbes has finely ex-

pressed this view of philosophy: "Philosophiam noli credere eam esse, per quam fiunt lapides philosophici, neque illud quam ostentant codices metaphysici; sed rationem humanam naturalem per omnes res creatas sedulo volitantem, et de earum ordine, causis, et effectibus, ea quæ vera sunt renunciantem. Mentis ergo tuæ, et totius mundi filia philosophia in te ipso est, nondum fortasse figurata, et genitori mundi qualis erat in principio informi similis."* While thus flying through all creation on the wings of thought, man is checked neither by the greatness of the object of his speculations nor by its smallness—neither by extent in space nor distance in time. He meditates on the nature of God as if He were man; like the Divine Essence to which he likens himself, he passes mentally into the abysses of space, and careers through worlds and systems extending into infinity. In like manner he plunges into the depths of time, and counts a thousand years as if they were but a moment. He penetrates by the eye of sense or of reason into the minutest phenomena of terrestrial life, and only comes to the one sure conclusion, that he, the Thinker and Seeker, is the representative of them all—a very microcosm in himself.

Such a philosophy is essentially, indeed avowedly, speculative, and contributes to man's happiness in the same way as any other speculative excitement. It is not a science which teaches him how to be happy under all circumstances and under all conditions; it is not the knowledge of good and evil, and of the means of avoiding the one and attaining to the other. To merit the designation of practical, philosophy should be so simple as to be intelligible, when properly studied, to men of ordinary

* Ad Lectorem, *Element. Philosoph.* 4to. Amstelod. 1668.

understanding; should be available to the daily and ordinary needs of man, whether in his domestic or social relations; should teach him true wisdom, in so far as wisdom consists in knowing rightly what happiness is, by what things of daily life it may be acquired and promoted, by what retained; should afford to man that true knowledge of himself which is essential to his future as well as present happiness; and, finally, its truths should so accurately correspond to the order of phenomena in creation, that therein the thirst for knowledge, and the doubts and fears and speculations of the inquiring mind, should find their contentment, and society the surest guarantee for solid order and progress. Such a practical philosophy of mind I believe to be attainable: no one will doubt that it is absolutely necessary to man's well-being. A practical science of mind—to state its objects more specifically—must be capable of a threefold application to practical ends: namely, first, to advance the happiness of man in his individual and domestic relations; secondly, to secure the welfare of society; thirdly, to advance that knowledge which secures the development of the race, and establishes man's dominion over nature. These form an ascending series of objects necessarily in relation to each other, and I will endeavour to illustrate each series. One and all, however, can only be aimed at through a mental science based on a philosophical physiology of the brain.

The first application of mental science to the happiness of the individual is comprised in the practice of medicine and mental hygiene. No intelligent man can observe the relations of his bodily states to his mental without observing that the *will*, the primary faculty of the human mind, is deeply influenced thereby. It is not only in the use of his muscular powers (for that is an exercise of the

will), in relation to the external world, that he is enfeebled or palsied by bodily disease; his voluntary efforts to recall his knowledge into consciousness, or memory, are equally under the influences of the corporeal organisation. So also as to the ordering of his thoughts and of his acts as a rational being: in minor states of bodily disorder they are confused, irregular, uncertain, and under imperfect control; in more serious forms the will is placed in abeyance thereby, and moral responsibility ceases in consequence. In like manner are his *feelings* subject to bodily disorder, whether in relation to others or to himself. Horace thus concisely expresses the psychological influences of the midnight debauch:

> "——— Quin Corpus onustum,
> Hesternis vitiis animum quoque prægravat unà,
> Atque affigit humo divinæ particulum auræ."

Not less, however, is the recognised influence on the temper of the empty stomach: hence a shrewd common sense leads a man to ask a favour of his patron after dinner rather than before; or to warm his soul to enthusiasm or charity at a banquet. Lord Chesterfield says a battle has been lost because a general had a fit of indigestion.

These familiar things are of daily occurrence. A change of temper in a child is held to be almost a sufficient proof of bodily derangement, arising either from the process of dentition or other morbid changes peculiar to infancy. In the sex, various morbid changes in the mental condition are constantly associated with functional changes in the organs appropriate to reproduction. At all ages, in both sexes, hardly any bodily disease, however slight, occurs without coincident changes in the consciousness. On these occasions there is not only a

feeling of lassitude and discomfort generally, but the memory is less vigorous, the perceptions less distinct, the judgment less firm, the thoughts less clear. More intensely developed, this state may pass into actual delirium, either continued or not; or, where the causes of the mental disorder are more definitely fixed in the nervous system (and especially in the encephalon), and the disorder itself more chronic, true insanity may result. In other words, the same causes which act upon one person to the development of an irritability of temper and feebleness or obscurity of thought hardly perceptible, may in other individuals utterly overthrow the reason. Often, indeed, so continuously do these two classes of morbid mental phenomena supervene, that it is difficult to draw the line between them, and determine whether the sufferer is insane or not; and in truth the one state may pass into the other even within a few hours, and back again, so that the same individual is now insane, now sane,—now courteous or amicable, now ill-tempered or reckless. There is no more fertile source of domestic unhappiness than this varying morbid state: it blights the hopes and pleasures of father and of child, of wife and of husband, of lover and of friend, of tutor and of patron, of scholar and of master.

Bodily ease (a feeling) and health of body are coincident; hence *dis*-ease is correlative with cessation of health of body; so that the change from the feeling of ease to bodily pain, or suffering, or disease, is a change in the consciousness, and therefore psychological. Nor is this change limited or restricted to mere corporeal states: on the contrary, it involves the whole man, as to both body and mind. When that change occurs, many other changes in the consciousness follow, varying infinitely in character. Thus it is that a true art of medicine

necessarily includes a knowledge of the relations of body and mind in health and disease. "It is the business of medical practitioners," says the distinguished President of the Royal Society of London, and of the Medical Council of the United Kingdom, "to study not only the influence of the mind on the body, but also that of the body on the mind; and in so doing they have the opportunity of learning, more than others, to trace moral effects to physical causes. Where others complain of a fretful, peevish temper, it may be that they are led to make allowance for the difficulty of self-restraint where there is a superabundance of lithic acid in the blood, or an organic disease in the viscera. In the catalepsy induced in a nervous girl by the so-called mesmeric passes, they see only one of the numerous phases of that multiform disease, hysteria; and in the mischievous, and sometimes even in the benevolent enthusiast, who by his sincerity and earnestness enlists in the cause which he undertakes the sympathy of the multitude, their more experienced observation will often detect the commencement of the illusions of insanity."*

It is not necessary that the changes in the bodily health that lead to morbid states of the feelings and will, or *vice versâ*, should be strongly manifested. On the contrary, they are often so slight as to be overlooked. Nevertheless it appears certain that no morbid change, however minute, can take place in the body, without a concurrent change, although not cognisable by observation, in the mind. Hence it is that the Greek word for disease, *pathos*—the root of the term *pathology*—which expresses the science of disease, was used also to express mental

* Sir B. C. Brodie, Bart. *Psychological Inquiries;* in a Series of Essays, intended to illustrate the Mutual Relation of the Physical Organisation and the Mental Faculties, 1st edit., 1854.

states of suffering, and is equally the root of the word *pathetic*. It is admitted, therefore, that in numerous diseases there are no very manifest changes in the mental condition; while in another class, although these occur, and are in fact a part of the symptoms, they are not the leading or most important symptoms. Thus, the "lowness of spirits" and irritability of temper felt by the dyspeptic are only looked upon as symptomatic of the disorder of the digestion; the mental prostration and even delirium of fever are considered as merely transient changes in the consciousness, which will cease with returning health. Such forms of disease constitute, in fact, the great majority of the cases treated by the physician, and, in regard to treatment, do not require, from their very nature, any special knowledge of the relations which the body bears to the mind. But when the bodily disease is manifested by symptoms predominantly involving the mental states, and more especially when it interferes with the moral responsibilities and social duties of the man—that is to say, in mental diseases—a special knowledge of the relations of body and mind is imperatively required for successful treatment.

Such knowledge can only be sound in proportion as it is based on a knowledge of the causes of healthy mental states; for disease being only relative to health or ease, the science of disease is only another term for the science of health, according to "the logical axiom that the knowledge of relatives is one, or that the knowledge of relatives is the same."* It follows, therefore, that medical science, in its fullest sense, includes the facts and principles of a practical science of mind—that is to say, a knowledge of the causes of both healthy and disordered

* Sir W. Hamilton. *Lectures on Metaphysics*, vol. i. p. 211.

changes in the consciousness. And such, in every age, has been the tendency of medical research, so that, whenever the physician passed from the mere practice of his art to the higher walks of inquiry, he inevitably became a metaphysician or mental physiologist. In this way it has happened that, from Hippocrates downwards, the most eminent and most successful physicians have all, without exception, been either the one or the other. And since the primary or fundamental symptoms of morbid corporeal states are psychological, it follows that a knowledge of the facts and principles of a practical science of mind is fundamentally necessary to the practice of medicine. Upon this point, indeed, there is no difference of opinion amongst intelligent persons, either in or out of the profession. In all the business of the physician, the phenomena of life and mind are inseparably associated; and consequently, without a scientific exposition of the correlations of their laws, anything like a practical application of mental philosophy to mental physiology and pathology is impossible. Such exposition and application, therefore, must necessarily constitute, as MEDICAL PSYCHOLOGY, one of the chief ends of a practical science of mind.

But are the study and uses of such a practical science of mind to be limited to the medical profession? If philosophy, in the restricted sense of the term, be admittedly open to every one who will engage in the pursuit, it follows *à fortiori* that a science which both instructs man in the conditions of a healthy and vigorous mental life, and comprises the end and aim of philosophy itself, should be at least an equal object of regard. There is, in fact, no question of interest to the individual to which such a science may not be practically available. In matters of daily labour, every man is concerned to know what will keep his faculties in vigour,

his memory good, his thoughts clear, his mind at ease. Every woman, whether wife, mother, or nurse, is all the better able to fulfil her duties if a knowledge of the reciprocal influence of body and mind, in infancy, in sickness, and in health, teach her how to treat and bear with the infirmities of child, husband, or invalid. In like manner, in the exercise of his social duties, every man needs a like knowledge of the reciprocal influences of body and mind. This is more especially true of man in his domestic relations as the head of a family, or in the exercise of his calling, when to rule or govern wisely is of importance. Hence, a practical knowledge of mental science is essential to parents and masters, jurists and legislators, schoolmasters and teachers, ministers, naval and military officers, governors of jails and penitentiaries, and large employers of labour. Much indocility, waywardness, stupidity, disobedience, and incorrigible viciousness, may often be clearly traced to the influence of the vital functions on the mental states; so that, unless the bodily health be restored, no change for the better in the mental condition is to be expected, however harshness and severity may be used with a view to reformation. In short, a practical science of mind is necessary to the successful pursuit of every profession whatever. The artist of every kind, whose business it is to please the senses, whether he be sculptor, painter, musician, perfumer, or cook; or to please the intellect, as preacher, orator, poet, or writer, must know practically the secret sources of pleasurable gratification, if he would be successful in his calling. The laws of feeling—that is of æsthetics, in the widest sense of the term—must be within the range of his studies, and their scientific and practical applications be as familiar to him as those of mathematics to the engineer. So also with those professions whose business is to lead

and guide men. The military and naval officer, the manufacturer or contractor, the colonial governor, the clergyman, the professional statesman,—each in his sphere must know the laws of human motives, so that he may be able to develop and direct the operation of the strongest incentives to action. Many of these motives have a deep root in the fundamental instincts of life and organisation, from whence they draw their energy and strength; and without a thorough acquaintance with these, anything like a scientific guidance and urging of men to the successful attainment of a common object is not possible. True it is that from time to time a genius arises — an *anax andron* — endowed with an intuitive knowledge of human nature and its secret motives, and works marvellous results. But even he would be all the more successful if his intuitions were corrected by science.

The kind of mental science thus hinted at, as necessary to the happiness and success in life of the individual, must constitute the proper foundation for that social psychology which, under the names of sociology, politics, or political economy, applies a scientific knowledge of human nature to the wants of the many. In a nation, as in everything else, the whole is equal to the sum of all its parts; the collective whole reflects the individual elements.* Practical sociology would therefore be the legitimate development of a practical mental science.

* "The laws of the phenomena of society are and can be nothing but the laws of the actions and passions of human beings, united together in the social state. . . . . Human beings in society have no properties but those which are derived from, and may be resolved into, the laws of nature of individual man. In social phenomena, the composition of causes is the universal law."— J. S. Mill. *System of Logic*, 2d edit., vol. ii. p. 454.

It is the only one that could be safely applied to the wants of man in society, inasmuch as all its fundamental truths have been already verified in the individual; and history could verify or correct all those special to it, for history is, or ought to be, a record of the experience of nations in every branch of social science and art.

One or two illustrations will best show the applications of mental science to the welfare and happiness of the many. In proportion as a population becomes more dense, and cities increase in number and size, both the complexities of the social problem, and the urgency of the need for its solution, increase. Hence public hygiene, especially as applied to large cities, is now attracting the assiduous attention of the moral philosopher; for the connection between the causes of ill-health, as affecting masses of the population, and moral degradation and vice, is no longer a question of doubt. The neglect of sanitary regulations and of moral duties are found to be inseparably associated; to raise the masses, we must first improve their physical well-being. But this is not true of the poor only. The same principle holds good in all the subordinate relations of man in society, so that none, from the monarch to the peasant, can rightly fulfil his respective social duties, if the inevitable influence which bodily conditions exercise over the morals be forgotten or neglected.

The great problems of sociology are more deeply involved, however, in the influences which the physical forces of nature exercise over mankind, by modifying the vital forces, and thereby the mental faculties. Few intelligent men are without experience of the power which changes in the temperature or direction of the wind have over their feelings and will. A knowledge of

such influences, considered as *climate*, is therefore an important branch of a practical mental science, taken in connection with its applications to political economy. To no nation could such scientific knowledge be more valuable than our own, whether we be considered as a colonising or a conquering people.

The varieties of mankind appear to be mainly due to climatic conditions, caused partly by the direct influence of the heat and light of the sun, the intensity of the seasonal changes, the proximity or remoteness of masses of water, and the like; partly by the influence of climate on the food, clothing, dwellings, and other conditions of the race. In consequence of the ethnic varieties in colour, form, mental character, and habits of life thus induced, ethnic varieties in the religion, laws, and forms of government arise. The science of ethnology takes cognisance of these varieties; but to be available to sociology in our colonies and dependencies, it must be founded on a scientific basis, such as can only be supplied by the correlations of life and organisation with mind in their fundamental details. Mr Buckle's "Introduction to the History of Civilisation in England" is most remarkable for the vigour and boldness with which the influences that some of the great laws of life, and organisation, and mind, exercise on mankind are discussed, in their especial relations to climate, food, soil, and the general aspects of nature. Food and soil, he shows, have been most influential on social development in Asia and Africa, climate most influential in Europe. To the philosophical physician, Mr Buckle's doctrines and researches cannot fail to prove highly interesting, because entirely kindred to his own. Hardly any of the questions Mr Buckle raises are new to him. Hippocrates, the oldest of medical authors, in his well-known treatise "On Airs, Waters, and Locali-

ties," treats expressly of the same topics that Mr Buckle treats of; and every one familiar with modern sanitary literature must know what a vast stride MEDICAL TOPOGRAPHY has of late made, both in this country and on the continents of Europe and North America. On the other hand, numerous ancient and modern writers have elucidated the same questions after much the same method, although by no means with that overflowing fulness of detailed proof which Mr Buckle supplies. Amongst those of modern times may be mentioned Montesquieu, Condorcet, and Filangieri.

Passing from these great questions in sociology, which are to be solved by a knowledge of the laws of action of external agents on the human body, and through it on the mind, we reach a still more complex problem in the growth and maintenance of the social state. The striking analogies observable between the development of individual organisms and species have been applied to the development of nations or large societies of men; and the rise and fall of empires have been suspected to be due to the operation of laws of growth, organisation, and decline, analogous to the laws of development, organisation, and decline manifested in the individual man. So that, although man may have attained to that full knowledge of the influence of external circumstances on his vital and mental states, and therewith to the ability to subdue external nature to his purposes, known as civilisation; yet, without a knowledge of those more hidden laws by which society culminates and declines, civilisation and all its advantages will ever be in danger of retrograding, and even disappearing. History has so often indicated this to be the cycle of events with empires, that the philosophic historian adopts it as a general principle of politics. Republics or monarchies grow up through a

youth of energetic action, vigorous inquiry, and brilliant fancy. An adult prime of masculine vigour is characterised by national wealth, comfort, and solid development of the intellect. Then the age of repletion arrives, with suspension of mental and bodily activity, and with gratification of the appetites; a palsy benumbs the imagination, scepticism vexes the intellect, and an admiration of the past stimulates to fixedness and hero-worship. To this finally succeeds old age or national decay, subjugation to more vigorous or younger nationalities, and revolutions in art, science, religion, if not subversion of them all. Such changes are more directly due to mental influences, less directly to physical or external, and are often modified by primary or inherent qualities, or groups of qualities, of the race,—themselves originated amidst climatic conditions in a far distant time, and transmitted from generation to generation with unwavering steadiness amidst all the variations in external circumstances.

It is not, however, in the influence of external circumstances on man exclusively of the influence of mind, nor in the influence of mind exclusively of the influence of external circumstances, that a practical science of mind finds its proper sphere. This is rather to be found in the reciprocal influences of the two classes of agents. To reduce the operation of these to general expressions, capable of application deductively to the wants of mankind, is the true end of practical philosophy, as well as of an all-comprehensive mental science. In this sense, indeed, the two terms are synonymous, and in none other; for a philosophy which excludes the whole of physics and of physiology from its inquiries, cannot be practical or scientific in any proper sense of the terms. To this conclusion, in fact, the most practical, and, at the same

time, most philosophical thinkers of the day seem to have come.

Amongst the many illustrations of these views which might be noticed, reference need only be made to one of the modes in which the important influence of agriculture is manifested in human society. The more material things which minister to the life of plants subserve also the life of animals and man. The laws of life are therefore common to both forms of life, as regards these material things. Now, Divine Providence has so arranged the order of events, that whatever develops the growth of such plants as serve for the food of man, or of the animals upon which he feeds, adds to human welfare, while, at the same time, it perfects vegetable life on the earth. So that where man settles, and labours, and multiplies, there the face of nature assumes more beauty; and man himself, contending more effectually with the physical influences to which, in common with all other living things, he is subject, becomes more and more developed in all the characteristics of humanity. In other words, civilisation flourishes. For the continued progress of mankind in this development, or, at least, for the permanence of civilisation, so far as regards food, one thing only is necessary—namely, to follow the order of events laid down by Divine Providence; which is, that the material constituents of animal and vegetable organisms shall pass from one to the other in a cycle of continual change and alternation. These changes take place in the air, earth, and water. The carbon given off as carbonic acid to the air by animals is taken up by plants, and fixed again as carbon; the phosphoric, silicic, sulphuric, and other acids, together with alkaline earths and salts, pass off with the animal excretions, and, when returned to the soil, maintain in vigour the vital powers

of vegetables destined to be the food of man and animals. Now, so long as this cycle of change is kept up, both forms of life flourish; but if the fixed mineral constituents that are constantly taken from the soil by plants be not returned to the soil, it at last becomes so defective in these constituents that vegetable life is no longer vigorous; in other words, the soil is exhausted, and production of food for man and animals ceases. Upon this exhaustion of the soil there necessarily follows, therefore, with the greater difficulty in the supply of food, not only a hindrance to the development of society, but a retrocession; and thus flourishing and civilised communities may slowly but surely decay, from the neglect of this fundamental law of cyclical interchange between animal and vegetable organisms.

Baron von Liebig has very lucidly illustrated this application of one of the fundamental laws of life and organisation to political economy, and shown the danger impending over Great Britain in this respect, by examples drawn from the history of ancient Rome and Italy.*

Amongst modern instances of national disaster thus induced, France at the close of the last century, and Ireland in this present, might be mentioned. In France, the full sweep of revolution arose from and was dependent on its defective agriculture; and if the spoliation and subjugation of that country did not close the series of national events, it was because the comity of civilised nations ruled otherwise. Ireland, too, was only preserved from famine by the modern appliances of commerce, developed at the cost of millions by the rest of the United Kingdom. If she had been a really independent nation—*i.e.*, both independent and self-dependent—nothing, it

* *Letters on Modern Agriculture*, edited by Dr Blyth (1859), p. 229.

seems probable, could have saved her from utter extinction but subjugation by a foreign power.

A practical mental science takes cognisance of higher influences than these. Man does not live by bread alone. The alternate cycle of nutrition may be maintained by industrial effort, as in China at this moment, where the people, it is said, have already practically solved the problem; or the mountain-streams may bring with them to the plains all those elements of food for plants which man takes away, and, overflowing the land, deposit thereon their mineral wealth in the fittest condition for vegetable nutrition, as occurs in Egypt or Mesopotamia, Hindustan or Italy. Yet even under these circumstances national decay occurs. The Assyrian and the Egyptian empires have long since disappeared, while the fertile plains of Hindustan and Lombardy have for centuries been the battle-field of more vigorous races. Here the exhaustion of the soil is no cause of national decay, for it has an inexhaustible supply of nutrient wealth in the overflowing rivers. We must look, therefore, to another cause of change, and this appears to consist in the decay of religion and morals. The natural development of the human mind is towards a knowledge of final causes. God and immortality are these final causes; but the relations of man to God and a future life constitute the foundation of religion and morals. It follows, therefore, that a practical mental science should investigate the laws of development of this knowledge in the individual and in the nation; and, applying the science of those laws to education, and to religious and moral culture, systematically evolve all the higher and nobler faculties of the human mind. To attain to such an end, physical and philosophical education must be combined with religious training, so that a knowledge of the laws of bodily vigour as

well as of mental energy may be equally and consentaneously applied to the purpose. In all ages and in all nations, emasculate pursuits have been coincident with decay in religion and morals; for the form of worship has always reflected the mental characteristics of the age. Thus the general worship of a feminine deity, under whatever name, is significant of national effeminacy and degeneracy; while, on the contrary, the worship of one God in the spirit indicates the operation of those masculine faculties by which men attain to a knowledge of Abstract Truth, and are enabled to know and reverence the Divine.

Now, effeminate pursuits, in the mass as in the individual, are the natural sequence to impaired corporeal vigour and defective cerebral development. This is more particularly true of those emasculating vices which consist essentially in the gratification of the sexual lusts by unnatural means. Such vices act directly on the nervous system, and render it imperfect; while it is strengthened by the sports of the field, or by exercises which call forth the muscular powers, and the native love of enterprise and danger inherent in man. But there is a cycle of change in the moral world, as in the vital or physical world. Large cities are unfavourable to the development of corporeal vigour, unless hygiene, or the science of public health, brings all its appliances to bear on their domestic economy. And being this, they are favourable, conversely, to the development of a quick sensibility of the brain without a corresponding corporeal vigour; of a quick sense of pleasure and pain, with a corresponding readiness to seek after pleasure merely, or shun pain; and of all the vices which depend upon the desires.

The entire mental character, indeed, is connected with

the action of those multitudinous causes of enervation which a high material civilisation necessarily draws with it, if not scientifically counteracted. As the physical vigour decays, the instincts of astuteness and cunning are developed in its place, and therewith fraud and falsehood in the various relations of life. In these respects the man becomes literally effeminate. The imagination also predominates over the reason, concurrently with exaltation of the cerebral functions, so that credulity and superstition are often correlative with a high æsthetic development, and with great quickness of perception and refinement of taste. The development of the fine arts is too often thought to indicate a corresponding advance in society; but it is evident from these considerations, that, unless accompanied by an equal development of the manly virtues and of the intellectual powers, it is but a sign of national degeneracy. Hence it too often happens that the decay of a state dates exactly from the period when the arts of life attained their maximum.*

By taking the moralist's view of the subject, we may attribute too much, perhaps, to the abuses of art; from

* Mr Ruskin has very ably set forth the political significance of a high æsthetic development. He observes :—"At the moment when, in any kingdom, you point to the triumphs of its greatest artists, you point also to the determined hour of the kingdom's decline. The names of great painters are like passing bells. In the name of Velasquez, you hear sounded the fall of Spain; in the name of Titian, that of Venice; in the name of Leonardo, that of Milan; in the name of Raphael, that of Rome. And there is profound justice in this; for in proportion to the nobleness of the power is the guilt of its use for purposes vain or vile; and hitherto, the greater the art the more surely has it been used, and used solely, for the decoration of pride (whether religious or profane no matter) or the provoking of sensuality."—*The Two Paths*, &c. By John Ruskin, M.A., p. 128.

the scientific point of view which I propose, we see more general causes in operation, and learn that high æsthetic development and an all-pervading love of sensual pleasures are coincident, and due to the same causes. It is therefore in a discovery of the laws of correlation of the moral and physical or vital forces, as they co-operate in the material organ of the mind, and their application to sociology, that a true mental science would win its highest triumphs; for a nation could thus be carried safely forward, by an applied philosophy of cerebral action, through successive phases of development, to the highest attainable pitch of physical, intellectual, and moral vigour, with the highest æsthetic perfection.

There is one other object to be mentioned, to which a practical science of mind would be subservient, and that is the complete development of philosophy itself. Such a science must necessarily investigate the laws of thought in correlation with the laws of life, or, in other words, develop the laws of Being. These would be the necessary laws of reason and existence. They would constitute the first principles of a science of human nature, comprising within it all the laws of thought and of language, as well as the laws of morals. Such a development would be the necessary consummation of all human science upon a knowledge of the Divine.

These, then, are the great objects of a full and complete mental science, in relation with a philosphical physiology. It is co-extensive in its scope with created things. It investigates the action of the physical forces, that it may determine their relations to the forces of life and organisation; it investigates the vital forces, that it may develop the relations of life and organisation to mind; and it investigates the phenomena of mind in their relations to physical and vital forces as operative in the

brain, that it may deduce general principles applicable alike to the material welfare and the highest moral, intellectual, and spiritual interests of man. It is necessarily co-extensive with that knowledge in which all men take interest, and is synonymous with that philosophy which Kant defined as the science of the relation of all cognition to the ultimate and essential aims of human reason (*teleologia rationis humanæ*).

CHAPTER III.

ON THE OBSTACLES TO THE DEVELOPMENT OF A PRACTICAL SCIENCE OF MIND, ARISING OUT OF THE ADOPTION OF ERRONEOUS PRINCIPLES AND IMPERFECT METHODS.

Having determined the objects to be arrived at in the development of a practical science of mind, the next step would properly be to set forth the method of attaining them. Before this be done, it is an absolute necessity to success to determine first in what respects the methods hitherto followed have failed in these objects, and the reasons of the failures; otherwise we may select a method which has already proved to be barren in practical results.

My friend and able colleague, Mr Fraser, Professor of Logic and Metaphysics in the University of Edinburgh, observes that complaints of the chaotic state of opinion, and the incurable discord of sects in philosophy, have become common, especially in modern books; adding—"It must be conceded, that some eminent leaders in philosophy have given their countenance to the opinion, that the past history of reflection is the history of an intellectual chaos; and that its guides may now hope to substitute a cosmos for the chaos. Two celebrated contemporaries, whose works have induced the greatest metaphysical movement in late times, Reid and Kant, may be quoted as instances. There is a remarkable coincidence between the opening part of Reid's *Essays* and the preface to the first *Critique* of Kant. Both deplore

variety and collision among preceding systems, as a scandal inconsistent with the unity of truth. Both contrast the oscillations of mental research with the steady march of the physical and mathematical sciences. Both look with good hope into the future, in case of a change in the old and still fashionable method of constructing systems of Philosophy. Both confess that preceding philosophers have wandered from the path. Both indulge the expectation that a path may still be found."* Kant's remarks are decisive. He says: "At present, as all methods, according to the general persuasion, have been tried in vain, there reigns nought but weariness and complete indifferentism—the mother of chaos and night in the scientific world." This indifference, he adds, "is plainly not the effect of the levity, but of the matured *judgment* of the age, which refuses to be entertained with illusory knowledge." Kant looked upon this state of things as a call to reason to undertake the most laborious of all tasks—that of self-examination; or, in other words, to adopt such a purely metaphysical method as is implied in the critical investigation of pure reason. "This path," he says, the only one remaining, "has been entered upon by me; and I flatter myself that I have in this way discovered the cause of—and consequently the mode of removing—all the errors which have hitherto set reason at variance with itself, in the sphere of non-empirical thought."† Kant was very conscious that his declarations of success must sound boastful and extravagant, but he justifies them by affirming that they are beyond comparison more moderate than those advanced by the commonest author of the commonest philosophical programme. Experience has proved the worth of Kant's

* *Rational Philosophy in History and in System;* 1858, pp. 21, 22.
† *Critik der R.: Vernunft.* Preface.

system. Philosophy has assuredly made great progress by the help of it; but as assuredly it is not yet in that satisfactory position in which that great thinker so confidently hoped he had placed it. While he investigated the laws of pure reason with a subtlety and depth, and I may add success, rarely equalled, he omitted to examine them in relation with the laws of action of that organ by which reason itself is possible. Hence he only opened the way for more successful methods, and left philosophy little improved as to its procedures and general results; so that a modern metaphysician hesitates not to say, "The best way of attaining to correct opinions on most metaphysical subjects is by finding out what has been said on any given subject by the psychologists, and then by saying the very opposite. In such cases we are sure to be right in at least ninety-nine cases out of a hundred."* Mr Fraser fully acknowledges how important is a knowledge of the relations of consciousness to organic life; nevertheless he is not inclined to agree with this disparagement of philosophy. On the contrary, he attempts to prove, "that no sphere of mental labour can record a longer series of illustrious successes than Rational Philosophy, when a true interpretation is applied to the historical phenomena, and when success is judged by the highest intellectual standard." Mr Fraser says ably and clearly all that can be said on this point, and demonstrates, at least, that the opinions referred to have been too broadly stated. Under any circumstances it must however be acknowledged, that the methods of studying human nature scientifically, hitherto followed, are imperfect. Thus, Mr J. S. Mill only re-echoes the general conviction when he remarks,—"In the departments of inquiry relating to the more complex phenomena of

* Professor Ferrier. *Institutes of Metaphysic*, p. 315.

nature, and especially those of which the subject is man, whether as a moral and intellectual, a social, or even as a physical being, the diversity of opinions still prevalent among instructed persons, and the equal confidence with which those of the most contrary way of thinking cling to their respective tenets, are proof not only that right modes of philosophising are not yet generally adopted on these subjects, but that wrong ones are."* And this is the criterion of philosophical progress which Kant himself sets forth in the preface to the second edition of his *Kritik* (1787): "Whether," he observes, "the treatment of that portion of our knowledge which lies within the province of pure reason, advances with that undeviating certainty which characterises the progress of *science*, we shall be at no loss to determine. If we find those who are engaged in metaphysical pursuits unable to come to an understanding as to the method which they ought to follow; if we find them, after the most elaborate preparations, invariably brought to a stand before the goal is reached, and compelled to retrace their steps and strike into fresh paths; we may then feel quite sure that they are far from having attained to the certainty of scientific progress, and may rather be said to be groping about in the dark."†

If we inquire into the causes of this acknowledged failure of philosophy to develop a science of human nature, we shall find that they are those which are now the recognised obstacles to progress in every department of science whatever. We have to blame, especially, an im-

* *Elements of Logic*, 4th edit. vol. ii. p. 288.

† *Kritik der R.: Vernunft.* Mr Meiklejohn's trans. p. xxiv. Bohn. This translation of Kant's *Kritik* is confessedly the best and cheapest published, and is therefore the edition I have selected for reference.

perfect conception of its objects and scope, and, as a consequence, the assumption of erroneous fundamental principles. We have also to blame incomplete and erroneous methods, founded upon erroneous principles, imperfect observation of the phenomena to be investigated, in consequence of the blinding influence of preconceived opinions, and injurious restrictions upon inquiry, the result of theological prejudices and of well-grounded fears for the safety of the great truths of religion and morals. Minor influences might be mentioned, but these are the principal causes of the perplexities, contradictions, and inutilities of Philosophy, considered as a science of mind. As a necessary preliminary, therefore, to the setting forth of such a method as may help to place Philosophy in its right place in the circle of the sciences, we must examine these untoward influences upon its progress, and illustrate them in detail. They will be best considered in two sections, for the theological prejudices and religious fears merit a special notice; we will therefore first notice some of the obstacles to the development of a practical mental science to be found in imperfect methods and in fallacious inductions, used as fundamental or general principles.

SECTION I.—*Separation of Philosophy and Physiology from each other, and from Experience.*

The inquiries into human nature have been followed according to three principal methods. The first is the empirical, or the method of experience only, without reference to scientific research or philosophical speculation. It is the method followed by mankind in general; its principles are embodied in aphorisms, maxims, proverbs, and the like, and are manifested in the language,

laws, and conduct of men. The second is the philosophical, which seeks to arrive at truth and a knowledge of human nature by speculative inquiries and *à priori* deductions founded on an examination of the phenomena of mind and consciousness—the things that are known or felt—the *noumena* as distinguished from the Manifested. The third is the scientific or physiological, which aims to attain to a knowledge of human nature by the inductive method, directed mainly to an examination of the *phenomena* of life—the things manifest in the body. To these, in strictness, might be added a fourth method—the unscientific—which uses partly one of the preceding methods, partly another, without reference to any fundamental general principles or primary data.

Now, as none of these methods have attained to satisfactory results, it is of importance to determine in what respects they are imperfect; and, upon a general survey, it appears that they have failed because their fundamental or primary data were false, and that these were false because the *nexus* of the subject-matters of inquiry was not comprehended. Each has been followed to the exclusion of the others. Thus, Experience knows nothing of metaphysic or physiology; Metaphysic ignores physiology and experience; Physiology divides itself by a sharp line from experience and metaphysic. Metaphysic limits itself to the phenomena of Thought. Physiology limits itself to the phenomena of Life. Experience examines the phenomena of both Life and Thought, but, adopting the erroneous limitation of metaphysic and physiology, arrives at no clear conception of either.

This bare statement of the matter may appear at first to be incorrect. It might be reasonably expected, for example, that the various morbid mental states known as insanity, which so imperatively attract the attention

of the physician, would have also led the metaphysician to a right estimate of that knowledge which experience gives as to the fundamental relations of body and mind; or that, at least, while he attempted to explain the laws of Thought as manifested in healthy states of mind, a solution of the problem as to unhealthy states would have been attempted also. But philosophy does nothing of the kind. These morbid mental states are even rejected as sources of knowledge. Reid only represents the notion of a school when, in reference to the delusions of lunatics, he remarks—"All I have to say to this is, that our minds, in our present state, are, like our bodies, liable to strange disorders; and as we do not judge of the natural constitution of the body from the disorders or diseases to which it is subject from accidents [a false premiss], so neither ought we to judge of the natural powers of the mind from its disorders, but from its sound state."* Hence philosophy, in rejecting so valuable a source of knowledge, sheds no light upon one of the most terrible inflictions to which the mind of man is exposed,—gives no knowledge as to its relations to morals, no information as to its causes, no help as to its cure. The social evils that have resulted from this rejection of the teachings of experience are incalculably great, and pervade the whole business of human life. In particular, education, ethical philosophy, and the administration of justice manifest them. Thus, the judges and juries of the land cannot pass by the question in this easy fashion when they have to decide what is or is not insanity. To a conclusion they must come, whether or no, in the case before them; and as they appeal to philosophy, the law, as administered by them, is involved in the errors and ignorance of philosophy. This prac-

* *On the Intellectual Powers*, Essay II. chap. v.

tical evil has been felt so strongly that, in 1843, the House of Lords called upon the judges of England to declare authoritatively, in their collective capacity, what state of mind really constitutes insane irresponsibility. The most important of their *dicta* was, that if it were proved that a criminal was incapable of distinguishing right from wrong when he committed the crime, the plea of insanity might be admitted, but not otherwise. The scientific and practical value of this solemn judicial *dictum* may be estimated from a consideration of the fact that a large majority of acknowledged lunatics, now legally restrained in public and private institutions for the insane, do possess this knowledge; and that, in truth, the government of these institutions is conducted almost wholly upon the principle that those who have to be governed have knowledge of good and evil, and of right and wrong. It follows, therefore, that if the judicial *dictum* were strictly applied, these persons ought not to be restrained, but should, as responsible agents, be permitted to enjoy social liberty.

Now, the physiologist is not, like the philosopher, professedly speculative: he has never, therefore, wholly ignored practical ends, nor discarded his experience of morbid mental states; but he has constantly been in doubt as to how far these states were physiological—that is, depended upon states of the body. Hence, while with all men of intelligence, delirium, furious mania, and the like, were admittedly corporeal diseases, those more subtle forms of mental derangement, in which the line of demarcation between healthy and disordered function of the brain is drawn with difficulty, were believed to be of incorporeal origin, and not disease. The management of the insane, up to the close of the last century, was necessarily guided by

those erroneous opinions and by the current philosophy, and was therefore of the most injudicious, nay, barbarous character. No one doubted—not the best, and wisest, and kindest of men — that stripes, and chains, and barred cells were the most efficient means of cure. A lunatic was treated medically as a criminal; and thus cruel bodily tortures were added to the mental agonies which the unfortunate sufferer endured. In truth he was a wretched being, cut off from all kindly sympathy, an object of horror and aversion to his dearest friends. If such was the treatment of those plainly and unquestionably insane, little indulgence could be granted to the weak in judgment or infirm in temper, in whom functional disease or a faulty organisation was the cause of their defects. The operation of such causes of mental defect was in fact hardly suspected, so that not a few insane fanatics in religion or in politics fell into the hands of the public executioner.

This wide separation of physiology from philosophy is the first fundamental defect we encounter—a separation which takes its origin in the ignoring by both of the facts of experience, as to the inseparable relation of body and mind. For although it will be fully conceded that physiology, of late years, has not neglected experience to anything like the same extent as philosophy, its fundamental principles are so little altered, that its facts and theories as to Mind and Life are incessantly at variance. Thus, the modern physiologist readily accepts the teaching of experience as to the phenomena of Life, because scientific observation is practically nothing else than a scientific experience; but he still rejects it as to the phenomena of Thought, and on the same grounds that he separates physiology from philosophy, or metaphysics—namely, that there is no parallelism or analogy between the two

classes of phenomena. Thus, a popular writer on physiology, in referring to the doctrines of Stahl, who recognised their identity, and maintained the old doctrine of their community as to cause, remarks, as to the teachings of experience, "Although there are few, if any, philosophers who would avow such a doctrine as that of Stahl at the present time, we trace its effects very evidently exerted upon popular opinion. We have known it maintained by many well-informed persons, that the phenomena of life and mind are obviously so closely connected, that, to refer one class to the operation of the properties of matter, without an independent controlling entity,—in other words, to set aside the doctrine of a vital principle,—necessarily implies the relinquishment of the idea of mind as a distinct existence. *Nothing, however, can be more absurd than such a dogma.* The two classes of phenomena are not connected otherwise than by a very remote analogy.* And the same writer, proceeding to express his own scientific views, adds, "All the phenomena of life (putting aside, of course, those psychical changes with which we are contrasting them) concern matter only, and consist in its actions and reactions; and there is nothing in them related to consciousness. It is but reasonable, then, to refer them to the laws of matter if we can do so. But the phenomena of mind are universally allowed to be of a very different character: there is nothing tangible or material about them; and whether we regard them as causes or results of material changes, our reasons must have a very different basis than the existence or non-existence of a vital principle. On this point all the most intelligent of modern writers are fully agreed." Amongst those quoted by this writer are Aber-

* Dr W. B. Carpenter. *On* LIFE, *Cyclopædia of Anatomy and Physiology*, vol. iii. p. 144.

nethy, Prichard, and Alison, all of whom contended against confounding mind, or the "conscious principle," with the vital principle.

Cabanis was the first after Stahl to work out the correlations of life and thought, and attempt a practical development of them.* Of his views Mr G. H. Lewes remarks: "This conception of a possible psychology is in itself enough to mark for ever the place of Cabanis in the history of philosophy. It establishes psychology as one branch of the great science of life. It connects the operations of intelligence and volition with the origin of all vital movements. It makes Life and Mind correlatives. This was a revival of the great truth clearly recognised by Aristotle, from whom it descended to the schoolmen. 'Impossibile est,' says Aquinas, very emphatically, 'in uno homine esse plures animas per essentiam differentes, sed una tantum est anima intellectiva, quæ vegetativæ et sensitivæ et intellectivæ officiis fungitur.' The division of life and mind, as two distinct entities, was introduced by the Italians of the Renaissance, adopted by Bacon, and once more rejected by Stahl, who returned to the Aristotelian doctrine. With the fall of Stahl's doctrine, the separation of mind from life again became the *dictum* of the schools until Cabanis."† The modern German schools have been more or less tinctured with it; while in England Mr Morell,‡ and especially Mr H. Spencer,§ have taken it as the starting-point of psychological induction.

But, with all its defects, cerebral physiology has always been very attractive to a large class of thinkers. It has

* *Rapports du Physique et du Moral de l'Homme.* 1802.

† *Biographical History of Philosophy.* Library edition, p. 623.

‡ *Elements of Psychology.* London, 1853.

§ *Principles of Psychology.* London, 1855.

been clearly seen that the physiology of the encephalic structures has plainly very numerous practical relations. Constituting collectively what may be termed the organ of mind, their healthy or morbid states, as such, manifestly influence all the most important affairs of man. The pathology and treatment of insanity; the connection between mental disorder and vice; the nature, training, and development of the mental powers; and, in short, the science of human nature in its most comprehensive meaning, can never be rightly understood until an accurate and comprehensive physiology of the encephalon is erected, and the relations of body and mind accurately set forth. These are some of the problems which PHRENOLOGY professedly grapples with, as established by Gall and Spurzheim. Such, then, being the character and objects of cerebral physiology, it is clearly an obstacle to the right application of its truths to mental science to affirm, as a fundamental proposition, that the phenomena of life and thought, as manifested in the brain, are not connected otherwise than by a very remote analogy, for it is wholly at variance with the facts. It is admitted by all, that every change in the consciousness is coincident with some vital change in the encephalon, no matter what or where. Without such vital change, no mental phenomena whatever are manifested.

Nevertheless, it must be admitted, that such a proposition of the physiologist justifies that correlative fundamental doctrine of the philosopher which is, on the other hand, the source of all the errors and fallacies of philosophical research,—namely, that the phenomena of consciousness, as knowledge, are the sole, the exclusive objects of his labours. The philosopher, therefore, makes no pretence to a knowledge or use of physiology. "The philosopher," observes Sir Wm. Hamilton, "requires for his

discoveries no preliminary preparations, no apparatus of instruments and materials. He has no new events to seek, as the historian; no new combinations to form, as the mathematician. The botanist, the zoologist, the mineralogist, can accumulate only by care, and trouble, and expense, an inadequate assortment of the objects necessary for their labours and observations. But that most important and interesting of all studies, of which man himself is the object, has no need of anything external; it is only necessary that the observer enter into his inner self, in order to find there all he stands in need of; or rather, it is only by doing this that he can hope to find anything at all. If he only effectively pursue the method of observation and analysis, he may even dispense with the study of philosophical systems. This is at best only useful as a mean towards a deeper and more varied study of himself."*

It is but justice, however, to a rapidly increasing school of modern philosophy, to state that these views are not held in their full extent by some of the best of modern thinkers. The intimate connection between mind and organisation, both as a fact of experience and in the relations of cause and effect, is recognised by several eminent writers, as Mr Spencer, Mr Morell, Mr Bain, and others. Perhaps Mr J. S. Mill presents the best illustration of a transitional school of this kind, although, in discussing this question, he rather argues from our ignorance than as to our powers and possible methods of inquiry. "That every mental state has a nervous state for its immediate antecedent and proximate cause, though extremely probable, cannot hitherto be said to be proved in the conclusive manner in which this can be proved of sensation; and even were it certain,

* *Lectures on Metaphysics*, vol. i. p. 383.

yet every one must admit that we are wholly ignorant of the characteristics of these nervous states; we know not, and at present have no means of knowing, in what respect one of them differs from another; and our only mode of studying their successions or co-existences must be by observing the successions and co-existences of the mental states of which they are supposed to be the generators or causes. The successions, therefore, which obtain among mental phenomena, do not admit of being deduced from the physiological laws of our nervous organisation; and all real knowledge of them must continue for a long time at least, if not for ever, to be sought in the direct study, by observation and experiment, of the mental successions themselves. Since, therefore, the order of our mental phenomena must be studied in those phenomena, and not inferred from the laws of any phenomena more general, there is a distinct and separate science of mind. The relations, indeed, of that science to the science of physiology must never be overlooked or undervalued. *It must by no means be forgotten that the laws of mind may be derivative laws resulting from the laws of animal life, and their truth, therefore, may ultimately depend on physical conditions;* and the influence of physiological states or physiological changes, in altering or counteracting the mental successions, is one of the most important departments of psychological study." *

The suggestion which I have italicised merits more than a passing notice, for it contains the germ of a new method. But Mr Mill has evidently written under the doctrinal influence of the current physiological school, that the vital changes in the nervous system are the "generators" or causes of the coincident mental states.

* *System of Logic*, 4th edit., vol. ii. p. 426.

This is a fundamental error in physiology, if the doctrine be taken in its absolute sense. The phenomena of life and consciousness are due to a common cause—an ordering law of design or adaptation to ends. In the present empirical and unphilosophical state of neurology and biology, thus fundamentally vitiated, I cordially concur with the opinion expressed by Mr J. S. Mill, to the effect that, to reject the resource of psychological analysis, and construct the theory of the mind solely on such data as physiology at present affords, is a great error in principle, and an even more serious one in practice. "Imperfect as is the science of mind," Mr Mill observes, "I do not scruple to affirm that it is in a considerably more advanced state than the portion of physiology which corresponds to it."*

SECT. II.—*Avowed Neglect of Observation and Induction in determining the Relations of Body and Mind.*

That philosophy and physiology have not long ago been thus intimately united in inquiry into the laws of mind, is due to various other causes besides this fundamental defect of philosophical method; it is sufficient to revert to one of the most important,—namely, the difficulties of the investigation which such union implies. The relations of vital to mental changes have been universally held to be wholly inscrutable; and undoubtedly, until within the last quarter of a century, physiology was hardly equal to the performance of its share of the investigation. Nevertheless it was, and is still, a common and apparently pleasant business with metaphysical writers to enlarge upon the extent of our insuperable ignorance; for it has at least this result, that an excuse was

* *Op. citato*, p. 427.

thereby secured for making no attempts to remove that ignorance. Professor Ferrier has well ridiculed this proceeding of psychologists :—" 'What does this cheese *consist of?*' says a customer to his grocer. 'Consist of!' answers the man—'consist of! why, it weighs twenty pounds to a hair, and *that is* what it consists of.' Our psychologists are that grocer. We ask them *what* ignorance is, and *what* we are ignorant of? and they reply that, while our knowledge is as mere dust in the balance, our ignorance is so *great* that it might ballast the whole British navy."* Such a procedure has necessarily rendered all philosophical researches defective at the very outset in the primary requisites to successful inductive inquiry.

Nor, looking at this source of ill-success from the metaphysical side, can we come to any other conclusion. All our knowledge is confessedly relative in its origin; yet philosophy professedly examines phenomena out of relation to each other. It investigates the universal as something apart from the particular, the absolute as apart from the contingent, the relative as apart from the correlative. By limiting the inquiry to the phenomena of consciousness, all other phenomena—the result of mind in action—are excluded. The great world of creation is shut out from view; and even all the infinitely varied acts of intelligence in lower animals laid aside as useless in the inquiry. But I will illustrate by details.

In answer to the question, "From what source must the knowledge of the mind and its faculties be drawn?" Reid answers, "The chief and proper source of this branch of knowledge is accurate reflection upon the operations of our own minds"—that is to say, thought, apart from any experimental inquiry into the influence

* *Institutes of Metaphysic*, p. 429.

which the body exercises upon those operations. Yet Reid fully recognised the general fact, that due activity of the brain is necessary to thought. "It is well known," he says, "that disorders in the brain deprive us of the power of perception." He also saw "that, as the impressions on the organs, nerves, and brain correspond exactly to the nature and conditions of the objects by which they are made, *so our perceptions and sensations correspond to those impressions, and vary in kind and in degree as they vary.*" Yet, with this clear and distinct acknowledgment of the part which the brain takes in thought, Reid passed over the practical conclusion flowing from it, and made no inquiry into the alleged correspondence between the actions of the organism, the "impressions," and the states of consciousness. This neglect of physiology he carried to an absurd length. Thus, in one of his letters to Dr James Gregory, in a note "On Power" (Reid's Works, p. 80), he thus speaks of volition in the morbid state of palsy:—"If I be struck with a palsy, that volition and effort which before moved my hand is now unable to do it. Is this owing to an inability to produce the first motion? or is it owing to mere derangement of the machine of the body? I know not." Nor does Dr Reid go on to say that it would be well to determine these questions by observation and experiment. On the contrary, he rejoices apparently in his ignorance and doubt; for he adds, "Nay, I am uncertain whether I be truly and properly the agent in the first motion; for I can suppose that, whenever I will to move my hand, the Deity, or some other agent, produces the first motion in my body—which was the opinion of Malebranche. This hypothesis agrees with all that I am conscious of in the matter." The hypothesis itself indicates a curiously clear perception of what must be known and determined

before we can comprehend the true nature of an act of volition, and by implication affirms the necessary knowledge to be attainable only by researches into the structure and working of "the machine of the body," upon the derangement of which the palsy depends. Yet, in common with all pure metaphysicians, Reid turned aside from the necessary researches, and ignoring for the future even the existence of the machine, confined himself to the discussion of abstract questions.

It is interesting to note how clearly Kant indicated the cause of this fatal neglect of observation. He attributed it to the employment of the psychological idea of the *Ego* as a constitutive rather than as a regulative principle. "When employed," he observes, "as such, for the explanation of the phenomena of the soul, and for the extension of our knowledge regarding this subject beyond the limits of experience—even to the condition of the soul after death—it is convenient enough for the purpose of pure reason, but detrimental, and even ruinous to its interests, in the sphere of nature and experience. The dogmatising spiritualist explains the unchanging unity of our personality, through all changes of condition, by means of the unity of a thinking substance, and the interest which we take in things and events which can happen only after our death, from a consciousness of the immaterial nature of our thinking subject, and so on. Thus he dispenses with all empirical investigations into the cause of these internal phenomena, and with all possible explanations of them upon purely natural grounds; while, at the dictation of a transcendent reason, he passes by the universal sources of cognition in experience, greatly to his ease and convenience, but to the sacrifice of all genuine insight and intelligence." *

* *Kritik der R.: Vern.* Transcendental Dialectic—App.

But further: This fundamental error as to the inscrutability of the sources of our knowledge, involves all the methods hitherto pursued for investigating the phenomena of nature. For it is clear that if mind cannot be investigated out of relation to matter, neither can matter be investigated out of relation to mind. In this way a seemingly well-founded but erroneous conclusion from phenomena runs as a thread of error throughout the cycle of the sciences. Professor Ferrier, with his usual sagacity, has placed his finger upon this result of the methods founded on the doctrine criticised. "The common division of the sciences into two leading categories,—the science of mind and the science of matter,—when regarded as more than a mere verbal, and, to a certain extent, convenient distinction, is founded on the fallacy contained in this psychological deliverance, and partakes of its fallaciousness. Indeed, to lay down the realism of subject and object as complete and absolute (that is, as an out-and-out reality which is not also a unity), which psychology frequently does, is to extinguish every glimmering of the scientific reason; for this implies that the realism as laid down in cognition is complete and absolute, which it can only be when intelligence can act in opposition to its own necessary and insuperable laws."* That such fundamental errors would vitiate an entire system, however well worked out, is a logical necessity.

If men were habitually to examine what is implied in the idea of son, without reference to the correlative idea of a parent, or to investigate light without reference to darkness, or life without reference to death, the process would be exactly analogous to that which is the fundamental method of philosophy. How, then, has this

* *Institutes of Metaphysic*, p. 111.

glaring defect been continued? Simply in this way. Every man who consults his daily experience of life, and who reflects upon the phenomena of his own mind, finds that he has a feeling or consciousness of existing apart from all other things in creation—that is, possesses an internal experience or intuition of his personality and individuality, and of his power to do, or not to do, as he chooses. But there is no closer connection apparent to the man himself between these intuitive feelings and the organisation, than there is between the man and the machines which he constructs and uses for his mechanical purposes. The hand or arm appears to the consciousness as but an instrument, just like the axe which the hand grasps. Under these circumstances the fundamental error in method leads to a fundamental error in observation and induction; for consciousness, being examined *as* something absolute, in virtue of the fundamental canon of philosophical inquiry, the step is easy to the conclusion that it *is* something absolute—*i.e.*, a separate and independent terrestrial agent. Then, this apparently independent relation of the consciousness to the organisation (for it is only apparent) is adoped by the speculative psychologist as the real relation; and thereupon he builds a whole system, or rather whole systems, of mental philosophy, "spiritualism," and the like, and develops their applications. There is not the slightest misgiving as to the unstable foundation thus taken. On the contrary, the principle is assumed to be sound, with the most unquestioning confidence, equally by Descartes, Spinoza, and Reid. "Again, we refrain," says Mr Isaac Taylor (I quote from an able work of his, lately published),* "from that which belongs to animal physiology, and therefore make

* *The World of Mind*, §§ 323, 325.

no inquiry concerning a nervous system, or that muscular apparatus through which animal movement is effected. MIND has no consciousness of power, or of muscles: volition is a purely rudimentary fact, having respect to nothing but the mental intention which is realised at the instant it takes place; how realised, the Mind neither knows nor cares, but the physiologist may discover it if he can. . . . On the one side there is Thought, or *mind in act;* on the other side there is *motion*—taking place in a mass, larger or smaller, heavier or lighter. The intervening apparatus we are unconscious of—we are quite mindless in regard to it; it is to the mind as if it were not."

Turn from this speculative psychology to the common sense of mankind, and its defects appear at once. The labourer, whose arm is paralysed, cares much to know how he may again wield the axe; the judge and jury, when the plea of insanity is advanced to shield the criminal, listen carefully to the facts stated in support of the plea as to the injured skull, the idiotic, ill-developed brain, the delirious ravings from some slight mental cause, the hereditary transmission of a tendency to diseases of the brain, and the like. So, also, while the speculative psychologist tells in eloquent language how the soul triumphs over old age, disease, and death, the legislator throws the protection of the law around the landed property of the sick and dying, by requiring strict proof that their last will and testament was made when not rendered imbecile in mind by senility, bodily infirmity, or disease. Thus the law, as representing the common sense and experience of mankind on the one side, and speculative philosophy on the other, are wholly at variance on the practical points. Nor is it difficult to see how the variance arises. The common sense of mankind looks wholly at the states of consciousness,

as modified by changes in the organisation, and speaks of the *man;* philosophy looks at the same states as wholly apart from organisation, and speaks of the *mind.*

This is also precisely the difference between the practical psychologist and the speculative philosopher. To the former, it is the man in his twofold constitution who is conscious, not the mind as apart from the man. As his states of body vary, so his states of mind vary—that is, his feelings, thoughts, motives, volitions, actions. Equally the practical man of common sense knows that these variations in the mental conditions depend, necessarily, upon variations in the bodily conditions; he guides his conduct accordingly, and uses agents which he knows will act upon the organisation when he desires to alter his states of consciousness. If he desires to abolish it wholly and be insensible to pain, he breathes the vapour of chloroform; if he wishes to be brilliant in imagination or glowing in diction, he swallows opium; if to be gay in spirit and joyous with a sense of vigorous life, he drinks wine. Philosophy and experience are thus wholly at variance in the practical business of life; it is not surprising, therefore, that thus failing in useful results, philosophy should have no regard from the mass of mankind.

SECT. III.—*The Defects and Ambiguities of Philosophical Terms.*

It is hardly credible to what an extent metaphysical writers have been betrayed into fallacies by the defects and ambiguities of their language and terminology. Thus, Sir William Hamilton shows that the term *sensation,* as used by Reid, means a special and limited act of consciousness; while philosophers in general understand by the same term a different and a general act. Sir

William Hamilton shows, too, thatReid devoted an elaborate criticism to the Cartesian system of ideas, not noting that the word *idea* in that system meant both the proximate bodily antecedent of the mental state, and that state itself. Hence his criticisms were wholly groundless and erroneous. Sir William Hamilton states the same of Reid's criticisms of Berkeley and Locke, and of Locke's criticism of Descartes. As to Locke, Sir William Hamilton asserts that his "whole philosophical language is, beyond measure, vague, vacillating, and ambiguous. In this respect he has afforded the worst of precedents, and has found only too many among us to follow his example." Sir William Hamilton amply shows, farther, "that the principal terms of philosophy have not only been frequently changed from their original meanings and correlations, but that these meanings and correlations are sometimes simply reversed. As an illustration, the use of the words *object* and *objective* by philosophers may be adduced. When applied in one way, it correctly indicates what exists of its own nature; when applied in another, what exists only in thought. Both of these counter meanings have obtained in the nomenclature of different periods and different philosophies—nay, in that of the same period and the same philosophy." Again, the words *idea* and *ideal*—in such universal use to express states of consciousness and their results—are employed in such vague and various meanings by philosophers, that Sir William Hamilton in general eschews them. Similar illustrations might be multiplied to almost any extent.*

It is obvious that these defects in the terminology and nomenclature of philosophy (which are familiar to

* Compare, *inter alia*, Professor Ferrier, *Institutes*, 1st edit. pp. 266–69.

all metaphysicians) must be fatal to its scientific advancement; for without precision in the meaning and use of its terms, no advance is possible in any, even the simplest, science of observation. It is clear, then, that a reform in philosophy must begin with a reform in its terminology; and I would venture to urge upon all those who take an interest in philosophical research, whether steps might not be taken for the purpose of establishing a general nomenclature or terminology of mental science.

The causes are various. They consist, firstly, in the inherent difficulties of the subject-matter of inquiry. Secondly, in the constant tendency of all words, in the progress of time, to be used in a sense sometimes widely apart from the meaning originally attached to them. Thirdly, in the inattention, ignorance, and deceit of writers, especially when polemical questions are raised, or some favourite system has to be developed. The main cause, however, lies in the fundamental errors of the method followed by the majority of inquirers, and which has been already set forth as an obstacle to the advancement of a practical philosophy. The terms refer to the phenomena of consciousness out of all relation to, and wholly disconnected from, the phenomena of Life. But those must be as variable as the vital changes with which they are inseparably connected, and upon which they depend. Hence the attempt to define them out of relation to the latter, is as difficult as it would be to define and describe the shadows that pass over the surface of a mountain, without reference to the sun, or the cloud, or the mountain's side. Until, then, there is a more fixed point of inquiry found in the correlations of the laws of the vital and mental forces, the terminology of metaphysic must remain obscure and contradictory.

It must, however, be stated, that these defects are to

be met with also on the side of physiology, even to a greater extent, as to the use of metaphysical terms, and to an almost equal extent in reference to the terminology proper to physiological science and the science of Life. Metaphysical terms are used very indefinitely by some writers in the discussion of mental physiology, or are used in too restricted a sense, or a sense altogether new; or new words are invented, apparently under the belief that new truths are expressed thereby, whereas they seem simply to indicate the ignorance of the writer. M. Agassiz has very clearly shown the evils of these proceedings in reference to zoology, and the distinctions made between species. "If such distinctions," he remarks, "are introduced under well-sounding names, they are almost certain to be adopted, as if science gained anything by concealing a difficulty under a Latin or Greek name, or was advanced by the additional burden of a new nomenclature! Another objectionable practice, prevailing quite as extensively also, consists in the change of names, or the modification of the extent and meaning of the old ones, without the addition of new information or of new views. . . . May we not rather return to the methods of such men as Cuvier and Baer, who were never ashamed of expressing their doubts in difficult cases, and were always ready to call the attention of other observers to questionable points, instead of covering up the deficiency of their information by high-sounding words?"*

The evil consequences to philosophy of these defects in method, principles, and language, have been most disastrous, from whatever point of view we consider it. Philosophers have most justly set forth the transcendent importance of philosophical culture. It is, or ought to be,

* *An Essay on Classification* (1859), p. 368.

the science of human nature, and should aim to obtain a knowledge of human nature not empirically, but deductively and inductively, so as to include within its range all human science. When the late Professor Dugald Stewart read to the Royal Society of Edinburgh his account of the Life and Writings of Dr Reid, he quoted from Mr Hume, to the effect that there is no question of importance whose decision is not comprised in the science of man; and there is none which can be decided with any certainty before we become acquainted with that science. "To prepare the way," he added, "for the accomplishment of the design so forcibly recommended in the foregoing quotation, by exemplifying in an analysis of our most important intellectual and active principles, the only method of carrying it successfully into execution, was the great object of Dr Reid, in all his various philosophical publications. In examining these principles, he had chiefly in view a vindication of those fundamental laws of belief which form the ground-work of human knowledge . . . leaving to his successors the more agreeable task of applying the philosophy of the mind to its practical uses."

How far, and with what success, this agreeable task of applying the philosophy of the mind to its practical uses has been fulfilled since the time of Dr Reid, is not a matter of doubt. While it has unquestionably made great advances, especially in the department of logic, it obviously still wants that higher development which can constitute it a practical science. It is not yet capable of application to the attainment of that practical knowledge of human nature which men desiderate in the conduct of affairs. The same defects are manifested in the relations of philosophy to the natural history sciences. With these it is in antagonism on some points, and in only

imperfect accordance on others. For want of that ordering and vivifying influence which it is the business of a true philosophy to shed through all departments of human knowledge, these sciences lie apart from each other like the scattered, disjected members of a glorious statue, awaiting a master-hand to bring them into harmonious combination.

This is by no means a new reproach to philosophy: if it were, I would hardly have ventured to state it; for that man may well be designated as presumptuous who, on his own conclusions, should venture to impugn the success of intellectual labours so great and so grand as the history of philosophy presents to our notice. It is, in fact, the conclusion of all thinking men. Nothing can be stronger on this point than the lately expressed opinion of a distinguished living metaphysician:—"It is a matter of general complaint, that, although we have plenty of disputations and dissertations on philosophy, we have no philosophy itself. This is perfectly true. People write about it, and about it; but no one has grasped with an unflinching hand the very thing itself. The whole philosophical literature of the world is more like an unwieldy commentary on some text which has perished, or rather has never existed, than like what a philosophy itself should be. . . . Hence the embroilment of speculation; hence the dissatisfaction, even the despair, of every inquiring mind which turns its attention to metaphysics. There is not now in existence even the shadow of a tribunal to which any point in litigation can be referred."*

Nor has philosophy been more successful as to other objects aimed at. Although it avowedly seeks truth for its own sake, its culture is also recommended as a

* Professor Ferrier. *Institutes of Metaphysic*, p. 5.

salutary exercise of the mental powers—a sort of soul-gymnastics, whereby the man is trained to detect and grapple with error. If, however, the practical psychologist turns to writers on mental philosophy, either in search of truth, or as an exercise of mental discipline, he is grievously disappointed ; for he finds himself too often bewildered in an entangled maze of words, and rises from the study of his subject with the opinion so energetically expressed by Sir James Mackintosh as to the German school of philosophy, that it is "accursed." Now, such a condition of things must be an insuperable obstacle to the attainment of any practical end whatever. In conclusion, it may be added that any science whatever, if based upon fundamental fallacies, or even if vitiated by one really fundamental error, must necessarily be involved more and more widely in every form of difficulty and doubt. So that, if we had not been able to place our finger upon some of the fundamental obstacles to a vigorous growth of a true science of mind, we could plainly have inferred that such there must necessarily be in the current philosophies, from a simple consideration of their defects (p. 37).

CHAPTER IV.

THE RESTRICTIONS ON THE PROGRESS OF MENTAL SCIENCE ARISING FROM THE PREJUDICES OF MANKIND AND THE DOGMAS OF SPECULATIVE METAPHYSICS AND THEOLOGY.

SECT. I.—*The Influence of a Fundamental Prejudice of Experience and Speculative Philosophy.*

ALTHOUGH few intelligent men are ignorant of the obstacles which preconceived opinions and prejudices present to the development of truth, it is not a wholly unnecessary task to direct special attention to some of those which stand in the way of a progressive science of mind. There are four kinds to be noted here—namely, (1.) Those which arise out of the prejudices of mankind; (2.) Those which arise from the teaching of imperfect systems of philosophy; (3.) Those which spring out of the subordination of philosophy to speculative theology; and (4.) Those which arise from the conflict of science with the interpretations of revealed Truth.

We have seen that both physiology and philosophy have agreed to adopt the fallacious fundamental principle that the phenomena of mind and lie are wholly distinct as to nature and cause, and ought therefore to be examined wholly apart. The divarication of physiology from philosophy which has resulted has its origin mainly with the philosophers; but it cannot be denied that the prejudices of physiologists, arising out of this fundamental dogma,

have blinded them as to the true meaning of the facts. Just as, when the Copernican theory was first promulgated, eminent practical philosophers spoke of its absurdity, and illustrated their asseverations by such arguments as that, if it were true, men at the Antipodes must stand on their heads, and the like; so physiologists, with a preconceived opinion as to distinctness of "mind" and "vital principle," can only see in the opinions of those who differ from them the absurd effects of popular errors in observation. Their dogmatism serves well to exhibit the effects of prejudices on the powers of observation, inasmuch as phenomena, which are so intimately associated, that they are wholly inseparable, even in thought, are declared, in consequence of preconceived notions, to be not connected, otherwise than by a remote analogy.

The consequences of this prejudice illustrates very well the wise teaching of an eminent living logician. "But the greatest of all causes of non-observation," remarks Mr J. S. Mill, "is a preconceived opinion. This it is which, in all ages, has made the whole race of mankind, and every separate section of it, for the most part unobservant of all facts, however abundant, even when passing under their own eyes, which are contradictory to any first appearance, or any received tenet."* It is in this way alone that it is possible to explain the strongly expressed objections of modern physiologists to the doctrine implied in the correlations of life and mind; for their daily and hourly experience must have taught its truth to *them*, at least, who had an intimate knowledge of the phenomena of Life.

The most fundamental prejudice of philosophy rests on its fundamental *datum*,—namely, that the laws of Thought can be investigated independently of the laws

* *System of Logic*, 4th edit. vol. ii. p. 337.

of Life and Organisation. Looking at the present state of philosophy from this point of view, it cannot be denied that, as to the prejudices which interrupt its development, its position is very similar to that which physical philosophy held at the period of the Reformation. Physicists, speculating at that era on the mechanism of the earth and heavens, started from the every-day experience of mankind as to the movements of the heavenly bodies. They were seen to move in circles through the firmament round the earth as a fixed point or centre. What more obvious conclusion than that the phenomena were as they appeared? Philosophy adopted that conclusion as a primary *datum*, and the Church and the common-sense of mankind confirmed it. Thereupon was built, as upon a sure foundation, an entire series of theological and other hypotheses, which were never doubted, and which at last became so fixed in men's minds as truths that it was considered an intolerable crime to question them. Thus the whole array of crystal spheres, and of cycles and epicycles, with their *primum mobile*, became part of theology. Hence it happened that, in the sentence of the "supreme and universal Inquisition" pronounced upon Galileo, the following conclusions occur:—"1st, The proposition that the sun is the centre of the world, and immovable from its place, is absurd, philosophically false, and formally heretical, because it is expressly contrary to Holy Scripture. 2dly, The proposition that the earth is not the centre of the world, nor immovable, but that it moves, and also with diurnal motion, is absurd, philosophically false, and, theologically considered at least, erroneous in faith." The result of the conflict which arose is well-known; and the truth which came forth was, that there was motion according to a fixed law—the law of gravitation.

All intelligent men are now agreed that there is motion round a centre as a fixed point, but that the motion is not real as to the apparently moving sun and planets; that the fixity is not real as to the apparently immoveable earth. Now, this simple change in the primary *datum* led to such an entire revolution in physical philosophy in general, as well as in astronomical science, as to change the material civilisation of the world; for the great advance of European, as compared with Asiatic nations, in material civilisation, and in all that contributes to the material happiness and welfare of society, during the last three centuries, is mainly due to the successful applications of natural science, so developed, to the wants of man. *Physics*, or natural philosophy, has passed from the library and church to the workshop and counting-house, and the ordinary influences of commercial enterprise may now be trusted for developing these applications more and more. That this cannot be said of *Metaphysics*, or speculative philosophy, is certain, if we consider that philosophy to include the science of human nature. It is still cultivated in the library, and its study restricted to a limited circle of philosophic and speculative men. To the great mass of mankind it is therefore wholly barren of results. Under no circumstances has it hitherto become a practical science, generally applicable to the daily wants of society. In these respects, mental philosophy has not changed much since the time of Plato, and European civilisation is not in advance of Asiatic. If things were otherwise, we should see mental science as much a part of a man's education as physical science, and working beneficially in the family, the school, the church, the studio; in the crowded town, the busy factory, the barrack, the camp; in the courts of law, and in the national councils. Yet

nowhere in human affairs do we see the principles of mental science guiding man's actions. Everywhere it is a more or less sagacious experience (as in the Middle Ages with regard to physical science), which takes the place of positive knowledge and of scientific truth—an experience, nevertheless, which, however sagacious, often errs, because it is not corrected by well-directed observation, nor guided by well-founded principles. Experience of human nature and the science of human nature have been so wholly severed, that a practical psychology could not be constituted.

This arrest of development of philosophy is greatly due to the fact, that men's minds are influenced as to the world of mind by a like fundamental fallacy, which was current for ages as to the world of matter. Mental philosophy, starting from its primary *datum* of consciousness, adopts the apparent for the real, and thereupon builds up whole series of systems which have the same defect as their fundamental principle—namely, are unreal, and are consequently wholly inapplicable to the real business of the world. It follows, however, from modern experience as to the enormous progress which physical philosophy has made, since a true primary *datum* and right method were adopted, that an equally important advance will be made in mental philosophy if a similar change be made as to its primary *datum* and method; so that we may thus hope to convert philosophy into a practical science, as available for the needs of man's spiritual nature, as physical science has been available to the satisfaction of his physical necessities. That such a change is needed, is manifest enough from the aspect of the times; and that such a change must accompany another great advance in civilisation, all past history teaches. These considerations render it of the greater importance

to examine the character of the obstacles to the general adoption of a new scientific method of inquiry, based on a new *datum*.

SECT. IV.—*Influence of Prejudices that have arisen from the Restriction of Speculative Philosophy to the Phenomena of the Human Mind.*

It has been long held as one of the fundamental dogmas of the speculative philosophy of Europe, that no animal besides man is endowed with a soul or mind; and that, consequently, the phenomena of mind are not to be studied in the inferior animals, but in the phenomena of the human consciousness exclusively. As a matter of common sense and daily experience, no one doubts the close similarity between the mental operations of man and the lower animals, especially of those that are his companions. And few modern metaphysicians would venture to affirm that there is any other dissimilarity than in degree of manifestation; indeed, it is acknowledged on all hands that there is no cognisable difference in kind. It would seem, therefore, that a COMPARATIVE PSYCHOLOGY would be welcomed by all earnest inquirers, as offering the means of investigating that great world of Thought in which the Divine Mind itself is confessedly manifested. Yet the conduct of philosophy has been wholly different. Man has been taken from community with his fellow-creatures, and placed in a world of Life and Feeling altogether apart. The Cartesians, or followers of Descartes, carried this logically to the fullest extent; for while they limited their investigations to the human consciousness, they denied that the lower animals had any consciousness whatever—they were insensible automata. Such was the absurd but logical result of

a false generalisation as to facts. The result was equally as absurd as to principles; for if lower animals were to be held as *automata*, how, with so many points of similarity (it was held by an atheistical school), can you maintain that men are anything more? And this conclusion had a reflected action on speculative theology. It was argued, that if animals were allowed to have feeling, we must either conclude that God dealt unjustly with his creatures, and so derogate from his perfection, or we must lower the dignity of human nature to a level with that of the brute, and cut off every hope of immortality. In short, the doctrine that men were at all to be compared with their fellow-creatures lower down in the scale of creation was considered so atrocious, that it was declared by one of the Christian Fathers to be an invention of the devil. "Quam vanitatem, ut inventum quoddam diaboli, meritò detestatur B. Chrysostomus, Homil. 4. in acta, exclamans, per philosophos hoc semper egisse diabolum, ut ostenderet, nostrum genus nihil a brutis differre."* And unquestionably Schuyl was correct in saying that many philosophers of high reputation had held the doctrine—amongst whom he enumerates "Zoroaster, Pythagoras, Anaxagorus, Plato, Plinius, Plutarchus, Porphyrius, Lipsius, aliique pene innumeri." Even the worshipped Aristotle was not exempt from this terrible charge.

The influence which the Cartesian school exercised over the opinions of men as to the nature of the mental phenomena of lower animals is hardly credible, although when we reflect that the "cause of Heaven" and the dignity of human nature were made to hang upon the question, it becomes less surprising. It required the

* Florentii Schuyl. *Præfatio in Cartesium de Homine.*

eloquence of a Fenelon to protect the lower animals from the terrible results of the Cartesian hypothesis; for, inasmuch as they were believed to be soulless automata, they were considered wholly insusceptible of pleasure or pain. The love and fidelity of the dog for his master was wholly an illusion.

"Insensible automate, il me suit sans me voir:
Il fait mes volontés sans jamais les sçavoir.
Sans colére il s' irrite, il gemit sans se plaindre,
Sans m' aimer il me flatte, il me fuit sans me craindre,
Le sang fait tout en lui, seul maître de son corps,
Sans qu'une ame préside au jeu de ses ressorts.
Si dans quelques momens, touché de ses caresses,
D'un cœur prêt à l'aimer j' écoute les foiblesses;
Si dans les châtimens qu'il me paroît souffrir,
Par ses cris douloureux je me laisse attendrir,
Descartes, en plutôt la Raison me rappelle,
Et dictant contre lui sa sentence cruelle,
Le declare *machine*——."*

But this may perhaps be considered a partial and peculiar example of the application of the Cartesian doctrines; let us then look nearer home. Reid's mind was eminently practical. Although hampered with preconceived opinions and prejudices, he often hit the truth in observation at least. Thus it was with regard to the mental phenomena of lower animals; he made all the necessary admissions for the establishment of a comparative psychology,† in making reason instinctive, and in-

* *Œuvres de M. L. Racine*, tom. vi. 12mo (Amst. 1750), tom. iv. p. 56.

† I subjoin a few of these:—"Perhaps not only our actions, but even our judgment and belief, is in some cases guided by instinct—that is, by a natural and blind impulse." Again, "The faculties which we have in common with brute animals are of earlier growth than reason. We are irrational animals for a con-

stinct rational. When we reflect upon the immense development which comparative anatomy has given to human anatomy and physiology, we cannot but regret that these doctrines have not had their application to human psychology during the last half century, as it is clear that as great an advance would have been made thereby in metaphysics, as in biology. But this was not to be: speculative dogmas in metaphysics and theology, derived from the Cartesian school, had already been embodied in the social and moral philosophy of the day; so that, when the fundamental principles were questioned, it was felt that the whole fabric of morals founded thereon was shaken. Hence, when Priestley asserted as a principle of philosophy that mental community of man and the lower animals which Reid himself maintained as a proposition of experience, and of which few men feel or express a doubt, Reid could only ridicule the doctrine with the Cartesians, as derogatory to man's dignity, and incompatible with social order. In a letter to Lord Kames,* Reid remarks:— "He (Priestley) thinks, and rejoices in thinking so, that plants have some degree of sensation. As to the lower animals, they differ from us in degree only, and not in

siderable time before we can properly be called rational." Again, "The operations of brute animals look so like reason, that they are not easily distinguished from it." With Addison, Reid even argued not only that the different species of animals had an instinctive sense of beauty, but that they developed the beautiful by acts of intelligence. "As we allow to brute animals," he remarks, "a *thinking principle or mind*, though far inferior to that which is in man; and as, in many of their intellectual and active powers, they very much resemble the human species; their actions, their motions, and even their looks, derive a beauty from *the power of thought which they express.*"—*On the Intellectual Powers*—Essay on Beauty, chap. iv.

* Letter II. in *Works*, edited by Sir W. Hamilton.

kind; only they have no promise of a resurrection. If this be true, why should not the king's advocate be ordered to prosecute criminal *brutes*, and you criminal judges to try them? You are obliged to Dr Priestley for teaching you one-half of your duty, of which you knew nothing before."

For the better comprehension of this important fundamental principle, I will mention another illustration of the bad results following upon these wide-spread prejudices. In ordinary psychology, the relations of human reason and of animal instinct have constituted an ever-recurring, ever-insoluble difficulty. Now, invariably, the differences only between these two forms of mind have been determined and classified, while the resemblances have been neglected. Even in phrenology, which uses comparative psychology, the vast and varied phenomena of insect life have no place. The practical result, in the study of human psychology, has been to exclude from it the generalisations from resemblances, and therewith the greater portion of comparative psychology, from the field of research. But a large number of mental phenomena are confessedly instinctive in man, are therefore corporeal, and, in so far as they are instinctive and corporeal, are identical in their relations with those of lower animals. *E.g.*, the whole of infantile life, from the moment of birth to an age that cannot be exactly determined, is purely instinctive; then for another period it is sensational; and from this stage childhood passes into youth, and youth into manhood, by insensible gradations. And tracing back the individual man through intra-uterine existence, we arrive at other successive stages—at first, mere vegetative life with organs; then corpuscular life, beginning with the primordial cell.

It is here well worthy remark how striking are the

resemblances between the highest faculties of man and those of lower animals. The philosophy of Reid is wholly founded upon the instinctive character of the former; and in defence of Reid's views, Sir William Hamilton abundantly shows that the word *instinct* has been familiarised for ages as a philosophical term, used expressly to denote the character of the higher faculties of the human mind, intellectual and moral.* This one generalisation proves how defective must be that method which fails to grapple with it, and apply it to the development of a true and comprehensive science of mind. For if all the higher faculties of man be instinctive, why is not this common characteristic of instinctiveness made available in inquiry? Why is this striking point of resemblance lost sight of in examining the *differentia* between the states of consciousness of man and other animals? It cannot be doubted that the failure is due to the same kind of prejudice which has prevented physiologists seeing the resemblances between the phenomena of Life and of Thought. Yet the resemblances are obvious both to the common experience of mankind and to the philosopher.

As a necessary result of this exclusion of comparative psychology from mental science, a sufficient knowledge of the instincts of man was of impossible attainment—nay, it has been found difficult even to theorise as to their nature.† When we remember that the crimes and

* *On the Philosophy of Common Sense;* Reid's Works, note A, § 5.

† Thus, Mr J. S. Mill remarks, "It is certain that, in human beings at least, differences in education and in outward circumstances are capable of affording an adequate explanation of by far the greater portion of character, and that the remainder may be in great degree accounted for by physical differences in the sensations produced in different individuals by the same external or

follies of mankind are mainly due to the uncontrolled operation of these instincts ("the Flesh" of theology), and that in insanity it is they which are most commonly involved, we get a glimpse of the fundamental inapplicability of current systems of mental philosophy to the most pressing and most common wants of mankind, which has resulted from these prejudices as to the analogies between man and the lower animals.

It is curious and instructive to note how a fundamental error of this kind exercises an injurious influence upon departments of science apparently widely apart. The study of the instincts of animals having thus had no proper position allotted them, either in science or philosophy, has become purely anecdotic—a collection of stories, curious if true, and even marvellous, but with no more scientific value than the "giant's" bones at which the earliest inquirers used to wonder when a gigantic fossil bone was revealed. Natural history has diverged into comparative anatomy and embryology on the one hand, and descriptive zoology on the other. So little, indeed, is the importance of comparative psychology appreciated, that the students of the habits of animals, M. Agassiz remarks, are hardly acknowledged as peers by their fellow-investigators, the anatomists and physio-

internal cause. There are, however, some mental facts which do not seem to admit of these modes of explanation. Such, to take the strongest case, are the various instincts of animals, and the portion of human nature which corresponds to those instincts. No mode has been suggested, even by way of hypothesis, in which these can receive any satisfactory or even plausible explanation from psychological causes alone; and there is considerable reason to think that they have as positive, and even as direct and immediate, connection with physical conditions of the brain and nerves as any of our mere sensations have."—*System of Logic*, 4th edit. (1856), p. 434.

logists, or the systematic zoologists. "And yet," he adds, "without a thorough knowledge of the habits of animals, it will never be possible to ascertain, with any degree of precision, the true limits of all those species which descriptive zoologists have of late admitted with so much confidence into their works. But, after all, what does it matter to science that thousands of species, more or less, should be described and entered in our systems, if we know nothing about them?"* With that philosophical comprehensiveness which M. Agassiz displays in all his writings, he shows the need there is for the study of a comparative psychology. "Is there an investigator, who, having once recognised the similarity between certain faculties of man and those of the higher animals, can feel prepared, in the present stage of our knowledge, to trace the limit where this community of nature ceases? And yet to ascertain the character of all these faculties there is but one road—the study of the habits of animals, and a comparison between them and the earlier stages of the development of man."† It is gratifying to observe that the modern school of zoologists, wearied with the interminable discussions as to Species, and the unsatisfactory results of the method hitherto followed as to the mental life of animals, have opened up a new field of zoological inquiry. Thus, one of the most philosophical of the modern French school remarks:‡—"True zoology, or that form of it towards which all other branches of natural science ought to converge, consists in studying the relations of organised beings and their connection with the inorganic world; in investigating the play of the organs as animated instruments

* *Essay on Classification*, p. 85. † *Ibid*, p. 89.

‡ *Rambles of a Naturalist.* By A. de Quatrefages, translated by E. C. Otto, vol. i. p. 50.

of these mysterious affinities; in penetrating into their mechanism; in following them in their modifications, in order to distinguish, if possible, between what is essential and what is incidental; in ascending from all those effects to the cause, and thus, perhaps, penetrating at some future day into the arcana of life: this is the end and aim of true zoology—the rest merely constitute the means."

SECT. III.—*Influence of Prejudices created by the Dogmas of Speculative Theology.*

Speculative theology, considered as distinct from religion and morals, has always sought to draw to its support arguments from speculative science or philosophy; and for the very obvious reason that some of the most important dogmas of Christian Churches, such as the doctrine of the Real Presence, of purgatory, of spirits or ghosts, and the like, are intimately bound up with metaphysical speculation. But inasmuch as, in speculative theology, the dogmas are the fixed and immutable elements, philosophy can only be allowed to prove them, not to examine into their truth, much less to disprove them. Hence, to the true ecclesiastic, philosophy is not an *inquisitio veri*, but a *confirmatio veri*.

Now this procedure places philosophy at once in a false position; for by its very nature it demands the right of free inquiry, inasmuch as it appeals to the reason for proof of truth, and not to authority.*

* "A system of philosophy," Professor Ferrier observes, "is bound by two main requisitions—it ought to be true, and it ought to be reasoned. If a system of philosophy is not true, it will scarcely be convincing; and if it is not reasoned, a man will be as little satisfied with it as a hungry person would be by having

On the other hand, speculative theology is professedly based on one of two things—Revelation, or the traditions of the Church—or on both. And by traditions of the Church I mean all authoritative expositions of the dogmas of a Church, of whatever kind they may be. Now, these are unchangeable, and, strictly speaking, are unreasoned—that is to say, they are mysteries, or things not comprehensible by the reason. Philosophy, therefore, has not the business in reference to them which it has towards all other things of human knowledge. It has simply to show their reasonableness—that is, that they are compatible with reason. But since every act of independent thought, antagonistic to any of the dogmas of speculative theology, must, in the very nature of things, be considered heterodox, and as these extend over a sphere of thought co-extensive with creation, philosophy, in discussing these dogmas, is, as it were, put into a sort of theological cage, against the innumerable bars of which it continually beats and struggles—happily, not always in vain. A remarkable instance of the obstacles to progress thus arising may be found in Sir William Hamilton's lately published lectures, in which the successful application of physiological research to philosophy is denounced as subversive of truth and a reverent adoration of the Supreme Being.*

his meat served up raw. Philosophy, therefore, in its ideal perfection, is a body of reasoned truth."—*Institutes of Metaphysics*, p. 1.

* "Even the gorgeous majesty of the heavens," says Jacobi (quoted as 'a great religious philosopher' by Sir William Hamilton), "the object of a kneeling adoration to an infant world, subdues no more the mind of him who comprehends the one mechanical law by which the planetary systems move, maintain their motion, and even originally form themselves. He no longer wonders at the object, infinite as it always is, but at the human intellect alone, which, in a Copernicus, Kepler, Gassendi, New-

I shall only refer in these remarks to a doctrine of speculative theology which is common to all Christendom, leaving out of consideration especially the relations of metaphysics to the dogma of transubstantiation—a dogma which, in Roman Catholic countries, has proved a signal stumbling-block to philosophical progress. The doctrine common to all Christendom is that of the resurrection of the dead and of a future life, which, in speculative theology, is transformed into the doctrine of the immateriality and immortality of the soul. No one thing has so much retarded the development of a true mental science, and at the same time so deeply perverted the faith of men from the Christian Revelation, than speculations on this article of belief. The process is simple. The speculative theologian, having discarded from his inquiries the mechanism in and by which man alike lives, and moves, and is conscious, is apt to use dishonourable weapons in defence of his method, and to denounce the proceedings of those who adopt a more practical procedure as something immoral, or at least dangerous to religious truth. The transition (we have seen, p. 53) is easy from the primary *datum* of consciousness, that we are not conscious of any dependence on organisation, to the dogma that thought and will are in fact, as well as abstractedly and in feeling, independent of organisation; and from thence to speculations as to the immortality of the soul,

ton, and La Place, was able to transcend the object, by science to terminate the miracle, to reave the heaven of its divinities, and to exorcise the universe. But even this, the only admiration of which our intelligent faculties are now capable, would vanish were a future Hartley, Darwin, Condillac, or Bonnet to succeed in displaying to us a mechanical system of the human mind, as comprehensive, intelligible, and satisfactory as the Newtonian mechanism of the heavens."—Sir William Hamilton, *Lectures on Metaphysics*, vol. i. p. 37.

and to the established principle of a modern school of philosophers, that no physiology of the brain or nervous system ever can explain, or help to explain, one purely mental phenomenon. The analogies of physiology may sometimes (it is grudgingly conceded by this school) *suggest* a mental law, but that, at most, is all it can do. Thought, and the laws of thought, *can* only be studied in self-knowledge, and the line of research through organisation must inevitably lead to pure materialism.

It is not possible for a thinking man to shun the question of a future state, when inquiring into the laws of existence in this life. The problem is too momentous for evasion, and the doctrine too great and good to be reasoned away on shallow grounds. How, then, it is asked, can the truths of science be made consistent with the truths of revelation, if it be granted that consciousness is wholly dependent upon organisation? Such a question the unphysiological psychologist necessarily puts; for he has laid down the dogma that consciousness is not only a proof of the existence of mind, but that it is the sole proof, since it is its very nature and essence. In other words, it is argued that that which only indicates *some* of the successive states or modes of existence of an agent is to be taken as indicating the nature of the agent itself, a proposition wholly at variance with sound logic as well as fact. This fallacy has arisen, apparently, from this very limitation of psychological inquiries to the phenomena of human consciousness exclusively; for the mind readily passes from a simple exclusion of a thing from consideration to the denial of its existence. Be this as it may, from this fallacy, deeply rooted both in philosophy and speculative theology, has sprung not only a neglect of a cerebral physiology, the basis of a practical psychology, but an active opposition to the *study* of it, on the

grounds that its conclusions are opposed to the doctrine of a future life. A practical student of cerebral physiology necessarily associates the varying states of the consciousness with varying conditions of the organ of consciousness—in no other way can he investigate the practical relations of the two. But by the speculative philosopher and theologian, consciousness, even in this world, is considered apart from its organ, and in his mind, to associate the two intimately and necessarily is "materialism;" so that a physician who teaches that mental derangement is due to disease of the organ (a fundamental truth), incurs the charge of materialism, and, with that, of infidelity and even atheism.

In this way polemical philosophy has seriously obstructed the progress of practical psychology, inasmuch as men have been deterred from the right study of it, both by fears for their faith and by dread of obloquy and persecution. The medical profession in especial has been made an object of attack; for in the honest exercise of their duties they must be practical psychologists, whether they will or no. To them the speculative propositions of the metaphysician are useless, because not leading to the discovery of means for the cure or alleviation of disease. If speculative philosophers really advanced the great doctrines of Christianity, their proceeding might have some excuse; but it is a most important fact, that this identical school of philosophy has perhaps more than any other tended to the spread of true materialism and scepticism, while, at the same time, it has hindered the advance of knowledge. With remarkable sagacity, Dr Reid long ago pointed out this tendency: "This must be owing," he says, "to some fundamental errors that have not been observed; and when these are corrected, it is to be hoped that the improvements that have

been made will have their effect." The fundamental error is in the *data* of the entire system. *Firstly*, it attempts to prove the future life of man by a hypothesis as to his immateriality, which hypothesis depends upon another as to the nature of matter; both which have hardly a logical foundation.* *Secondly*, the proof has been founded on premises which are contrary to the universal experience of mankind, and thus the reason of man has been placed in opposition to his instinct for a future life. But I need hardly say, that to fix the proof of a great truth in religion and morals upon a hypothesis which daily experience shows to be wholly untenable, is, in fact, to do the utmost injury to religion and morals; for it necessarily leads thinking men to the inference, that, the premises being untenable, the conclusions are false. And thus, in fact, it has happened; so that the attempts to demonstrate the doctrine of a future life by *a priori* arguments of a metaphysical character, have contributed more than the direct attacks of real infidelity, to shake the faith of man in the greatest truth of religion, whether natural or revealed.

On the other hand, it is to be noted that a true philosophy, so far from being opposed to this fundamental truth of Christianity, confirms it. For, by comprising the phenomena of both Life and Thought under one

* Professor Ferrier has well put the logical difficulties of the general proposition, that in consciousness there is a particular cognition of self, as the *ego*—that is, that mind is known like matter as a particular cognition, and not as the element common to all cognition. But, in particular, he remarks, that it has caused psychology "to miss the *only* argument which has any degree of force or reason in favour of the immateriality of the *ego*, mind, subject, or thinking principle."—*Institutes of Metaphysic*, pp. 217 and 221, *et seq.*

generalisation, those difficulties and disagreements are made to disappear which arise when they are held widely apart, and each is examined separately from the more limited point of view of speculative theology. The inquirer (as we shall see) is able to pass beyond the variable phenomena of Consciousness and of Life to an Energy in action—a *quoddam Divinum*—which is not material or physical, except in so far as it is the cause of these phenomena, and is the source of all universal and necessary truths, of which the idea of a Future is one of the most fundamental.

SECT. IV.—*Prejudices arising from the Apparent Antagonism of Mental Science to Revealed Truth.*

The fourth class of prejudices we have to consider are allied to the preceding as to their theological aspects: they arise from the fallacious conclusion that mental science is opposed to revealed Truth. This kind of obstacle to the progress of scientific knowledge is no new thing, nor is it of little importance in the present day, when Science generally is brought into apparent conflict with Revelation. The history of astronomical and geological research shadows forth the future of mental science in this respect, and the obstacles it will have to encounter. The question is a general one, and as such has been discussed by the Rev. Dr Whewell in a spirit which hardly leaves anything to be desired. He remarks*—"The Revelation on which our religion is founded seems to declare, or to take for granted, opinions on points on which Science also gives her decision; and we then come to this dilemma—that doctrines

* *History of the Inductive Sciences*, 3d edit. (1857), vol. i. p. 310.

established by a scientific use of reason may seem to contradict the declarations of Revelation, according to our view of its meaning; and yet that we cannot, in consistency with our religious views, make reason a judge of the truth of revealed doctrines. In the case of astronomy, on which Galileo was called in question, the general sense of cultivated and sober-minded men has long ago drawn that distinction between religious and physical tenets which is necessary to resolve this dilemma. On this point, it is reasonably held, that the phrases which are employed in Scripture respecting astronomical facts are not to be made use of to guide our scientific opinions: they may be supposed to answer their end if they fall in with common notions, and are thus effectually subservient to the moral and religious import of Revelation." But this distinction in reference to astronomical facts, now universally recognised, was not accomplished without long and distressing controversies, nor without serious apprehensions that the whole fabric of society, as regards its religious bearings, was endangered. A similar crisis has arisen in our own times as to the facts of geology, with apprehensions and controversies of a like character; and it is clear the facts of mental science will in their turn have to undergo the same ordeal. Dr Whewell, in common with all the most enlightened advocates of religion and morals, sees the imperative necessity of laying down some canon adequate to the reconcilement of religion and science under all circumstances, so that they shall not be brought at least into real antagonism to each other, inasmuch as the progress of science renders an apparent antagonism unavoidable.

The intelligent reader will easily discover how constantly the current psychology and philosophy of the age is reflected in the Sacred writings of a contemporary.

date. Now, as these are of the most ancient origin, a discrepancy between modern doctrines and those of Scripture inevitably arises; a discrepancy all the greater, since the microscope has done that for the world of organisation which the telescope has done for the universe at large. And in reference to the changes in doctrine, as compared with those ancient systems of philosophy reflected in the Sacred records, which modern mental science may effect, the remark of Dr Whewell is particularly applicable, when, with a sagacious presentiment, he remarks, "We can hardly foresee beforehand what part of the past history of the universe may eventually be found to come within the domain of science, or what bearing the tenets which science establishes may have upon our view of the providential and revealed government of the world."* Dr Whewell has discussed this question so ably, and placed it before the public in so accessible a form, that I need only refer to his work. Whatever may be thought on the matter, two conclusions must be held as indefeasible—namely. 1. That scientific and revealed truth can never contradict each other; and, 2. That men will never cease to inquire into truth, whatever may be the fears of the timid, or the obstacles raised by the prejudices of speculation, and the selfishness of bigotry and hypocrisy. Man is created to know God and his works, and must fulfil the end of his existence.

But higher considerations than these arise out of this question. Has Revelation, in fact, ceased? or is the present era only another form of God's providential dealings with mankind? When we consider that with Him "there is no variableness, neither shadow of turn-

* *History of the Inductive Sciences*, 2d edit. vol. i. p. 311.

ing;" when we look at the great beneficial results which modern science has achieved already; still more when we attempt to calculate what the future has in store for mankind;—we cannot but think that Bacon and other philosophers of his day were not too enthusiastic, when, contemplating the grandeur of modern science, they earnestly expressed their belief that these are the days referred to by one of the Jewish prophets as those in which "many shall run to and fro, and knowledge be abundantly increased; and the knowledge of the Lord shall cover the earth as the waters cover the sea." Science itself, in its highest and fullest development, is religion; for although there may be now and then an "undevout astronomer," yet the deepest thinkers are agreed, and have always held, that a knowledge of creation and its laws can only lead to the knowledge and love of God.

Hence the Prince Consort not less truly than eloquently declared at Aberdeen, on the 16th September last, to a large multitude of the followers of science, that philosophers are not vain theorists or conceited pedants, wrapped up in their own mysterious importance; adding, "Neither are they daring and presumptuous unbelievers —a character which ignorance has sometimes affixed to them—who would, like the Titans, storm heaven, by placing mountain upon mountain, till hurled down from the height attained by the terrible thunders of outraged Jove; but rather pious pilgrims to the Holy Land, who toil on in search of the sacred shrine, in search of truth—God's truth,—God's laws as manifested in His works, in His creation."* And in an equally impressive manner an accomplished living philosopher vindicates the reli-

* Address by H.R.H. the Prince Consort, as President of the British Association for the Advancement of Science, 1859.

gious character of physiology. "To the real philosopher," remarks Dr Whewell, "who knows that all the kinds of truth are intimately connected, and that all the best hopes and encouragements which are granted to our nature must be consistent with truth . . . it will appear natural and reasonable, that, after journeying so long among the beautiful and orderly laws by which the universe is governed, we find ourselves at last approaching to a source of order, and law, and intellectual beauty; that, after venturing into the region of life, and feeling, and will, we are led to believe the Fountain of life and will, not to be itself unintelligent and dead, but to be a living mind, a power which aims as well as acts. To us this doctrine appears like the natural cadence of the tones to which we have been so long listening; and without such a final strain, our ears would have been left craving and unsatisfied. We have been lingering long amid the harmonies of law and symmetry, constancy and development; and these notes, though their music was sweet and deep, must too often have sounded to the ear of our moral nature as vague and unmeaning melodies floating in the air around us, but conveying no definite thought, moulded into no intelligible announcement. But one passage, which we have again and again caught by snatches, though sometimes interrupted and lost, at last swells to our ears full, clear, and decided; and the religious hymn in honour of the Creator, to which Galen so gladly lent his voice, and in which the best physiologists of succeeding times have ever joined, is filled into a richer and deeper harmony by the greatest philosophers of these later days, and will roll on hereafter the 'perpetual song' of the temple of science." *

* *History of the Inductive Sciences*, 3d edit. (1857), vol. iii. p. 392.

I can add nothing more to this eloquent passage than the expression of my conviction, that the reader and student will find in these pages that which will confirm his faith in a fountain of Life and Will, not unintelligent and dead, but a living Mind, which aims as well as acts —a Mind with which he can claim kindred, not by faith only, but by the conviction of knowledge. And it is a hopeful sign of the times, that on every hand the intelligent and advanced thinkers, in all the various conflicting sects, are beginning not only to see the need of allowing no dogmas to interfere with the development of scientific truth, but, on the contrary, to feel it to be a sacred duty incumbent on them, as religious men, to advance it by all possible means, as the best help to religion and morals.

CHAPTER V.

ON A PROPOSED METHOD FOR THE DEVELOPMENT OF A PRACTICAL SYSTEM OF MENTAL SCIENCE.

Having examined the objects of a practical science of mind, and the obstacles to the attainment of these objects, which are raised by preconceived opinions, prejudices, fundamental fallacies, and imperfect methods, we have now to determine what are the principles and what the methods which should guide us in avoiding those obstacles, and developing a practical system of mental science. To this end we have to determine man's sources of true knowledge, and his best methods of applying it. The first of these for consideration is experience.

Sect. I.—*On the Generalisations to be derived from the Common Sense and Experience of Mankind, as the Fundamental Principles of a Practical Science of Mind.*

We have seen (Chapter II.) what a wide field of inquiry is opened out to the metaphysician who would fully develop mental science to practical uses. In its highest development and widest extent it may be termed the science of human nature, and considered as a group of sciences having the laws of thought for the common basis of them all. These are metaphysics and psychology; philology and logic; sociology, or the sciences of political economy and law; ethics, and natural theology. The entire group

constitute, as a whole, what is termed Philosophy. Now, since all the states of Consciousness are the phenomena to be brought under the laws of Thought, and as all these, without exception, coincide with Existence, and therefore with vital processes without which they cannot take place; it is necessary, for a sufficient exposition of those laws, that the laws of the vital processes which correlate phenomena of Consciousness be determined in their relations to those phenomena. Consequently, the sciences of human nature, being founded on the laws of Thought, must comprise also that knowledge of the laws of Life which is necessary to a correct and sufficient exposition of the laws of Thought. Without this the entire superstructure must be unstable, and the scientific doctrines unsound. Hence biology (or more properly physiology, in the larger sense of the term) must be included in philosophy (p. 12).

Physiology, however, is itself a derivative science. Vital processes are intimately connected with the forces of matter. They are immediately dependent upon some of them, as heat, light, and chemical affinity; while as to others, the whole business of life seems to consist in resisting them. Hence the laws of Life cannot be investigated without reference to the laws of Matter, with which they are correlative. Formerly, physics was considered as wholly distinct from biology (or physiology), just as biology is considered to be wholly distinct from metaphysics. But of late years that direct relation of the physical and vital forces, the practical bearings of which I pointed out more than twenty years ago, has been recognised, with the best results.

The sciences, therefore, resolve themselves into three great departments of human knowledge—the physical; the physiological, vital, or biological; and the metaphysical.

In the first are comprised those sciences which treat of matter and its forces; in the second, those which treat of life and organisation; in the third, those which treat of mind. But philosophy extends its roots into and through all; for, inasmuch as the laws of thought correlate those of life and organisation, and these, again, the great laws of matter, philosophy must include all. Consequently, philosophy, considered as the science of human nature, ought to attain to a knowledge of human nature—not empirically, but deductively, through conclusions derived from the entire range of all human knowledge.* Here, then, we find, theoretically, that the right method of inquiry, in a practical science of human nature, is the converse of the methods hitherto followed. We must not separate the physical from the vital forces, nor the vital forces from mind, but adopt such a method as shall concentrate all science of these upon an investigation of the nature of man.

Let us, however, put the question in a more practical form, and inquire by what test or tests we can ascertain whether we are following a right method or not. Now, the criterion I would set forth is this: Since true philosophy must be sufficient to explain phenomena satisfactorily, and be at the same time an applied science of human nature, the method must be such as shall comprise all true explanations hitherto attained by science, and all principles which are both admitted to be true by the common sense and experience of mankind, and proved to be true by their applicability, deductively, to the wants of mankind; that is to say, the principles of a practical philosophy must not only be deduced from man's experience, but, conversely, be tested by experience. It is such

* *Ante*, p. 32.

principles of philosophy alone which can be made available for the advancement and union of the natural sciences, and be at the same time practical.

The grounds of this conclusion are these:—The principles derived from the experience of mankind in general are empirical laws—that is, laws of experience. They simply assert in general terms what have been found to be the invariable relations or successions of phenomena; and what have been found to vary with the circumstances of variation as to time, place, and the like. "The indispensable foundation of a scientific formula of induction must be a survey of the inductions to which mankind have been conducted in unscientific practice, with the special purpose of ascertaining what kinds of uniformities have been found perfectly invariable, pervading all nature, and what are those which have been found to vary with difference of time, place, or other changeable circumstances."* Man is necessarily conducted to such unscientific generalisations by the laws and conditions of his existence. Like all other animals, he is endowed with instinctive or intuitive powers, by which he is enabled to adapt himself to the varying influences of the external world. But since he has to adapt himself by instincts of reason and knowledge, and not unknowingly—that is, by blind instinct—he is compelled by the very necessities of his position to acquire such a knowledge of the order of nature that he can apply it readily to his uses. It is this knowledge which constitutes the experience of mankind. Hence it follows, that the laws derived from that experience, although often obscurely apprehended, are true laws, and, when formularised according to a scientific method, may be used not only

* Mr J. S. Mill. *System of Logic*, 4th edit. p. 357.

deductively as the principles of a practical science of human nature, but synthetically, for the connection and explanation of those principles which are derived from corrected experience and observation—that is to say, which are true scientific inductions. It follows, therefore, from these considerations, that these great empirical generalisations from the experience of mankind may be safely adopted as the primary data of mental science, from which we may develop, deductively and inductively, those other principles of the subordinate sciences of human nature which constitute *their* primary data, as the several departments or subdivisions of the general science. In every case these primary data must be of the nature of inexpugnable truths, and be of the widest extent as generalisations of experience; otherwise they can never serve the purposes of the inquirer.

Science has already developed in each of the three great departments of knowledge a number of general principles or laws. These have not yet been correlated, or, in other words, their relations to each other not made manifest; partly because of their imperfect development, principally, however, because those departments have been kept so systematically apart from each other, that they have been placed in antagonism and not in relation. They therefore await such higher generalisations as will serve to bring them under more general principles and more comprehensive laws, so as thereby to effect that unity of the sciences which is the ultimate goal of philosophy. Now it is in man only that there is a unity in experience of the three great forces of creation—the physical, the vital, and the mental. Consequently the generalisations, as to these, of the experience of mankind, will supply the principles required.

SECT. II.—*On the Method of Detecting and Formularising the Generalisations of Experience.*

Seeing that experience must supply and finally correct the fundamental principles of a practical science of mind, and seeing also that that experience ranges over phenomena co-extensive with those of creation, the next question to determine is, how we can detect and formularise the conclusions to which the common sense and experience of mankind have led.

The experience of man is manifested in three different but closely related modes—namely, in his language, in the laws which regulate his conduct as a social being, and in his conduct as an individual. If his experience of any of the great uniformities of nature, as manifested in these three modes, can be formularised into a general proposition, that proposition will express a fundamental empirical law, fit to be received among the primary data of a true and practical philosophy.

This is not the place or the occasion to develop the first principles of the philosophy of language. It is sufficient for our purpose to show that it supplies evidence of first principles. Both metaphysicians and logicians agree upon this point. Thus Professor Ferrier remarks, "First principles of every kind have their influence, and, indeed, operate largely and powerfully, long before they come to the surface of human thought, and are articulately expounded. This is more particularly the case of language. The principles of grammar lie at the root of all languages, and preside over their formation. But these principles do their work in the dark. No man's intellect traces their secret operation, while the language is being moulded by their control; yet the mind of every man who uses the language with propriety and effect is imbued with these

principles, although he has no knowledge of their existence. . . . The operative agencies of language are hidden; its growth is imperceptible. Like a tree, unobserved through the solitudes of a thousand years, up grows the mighty stem and the mighty branches of a magnificent speech." Again, "That most elementary species of instruction which we familiarly term the A B C, had no express or articulate existence, in the minds or on the lips of men, until thousands of years after the invention and employment of language."* Single words are, in fact, when rightly understood, the expressions of general principles. It has been long known that general terms are but the expression of the generalisations of mankind. Thus Sir William Hamilton remarks, "Generalisation is notoriously a mere act of comparison. We compare objects; we find them similar in certain respects —that is, in certain respects they affect us in the same manner; we consider the qualities in them that thus affect us in the same manner as the same; and to this common quality we give a name; and as we can predicate this name of all and each of the resembling objects, it constitutes them into a class. Aristotle has truly said, that general names are only abbreviated definitions, and definitions, you know, are judgments. For example, *animal* is only a compendious expression for *organised and animated body; man*, only a summary of *rational animal*."† So that names and general terms are the direct effect of those mental and vital processes whereby man attains to a knowledge of things around him; they ex-

* *Institutes of Metaphysic*, pp. 12, 13. The student will find in an interesting work lately published, *The Fundamental Doctrine of Latin Syntax*, by Simon Laurie, M.A., a very valuable exposition of some of the true principles of language.

† *Lectures on Metaphysics*, vol. ii. p. 313.

press the results of thought and inquiry, and are therefore generalisations in the strictest sense. Mr J. S. Mill has so explicitly shown the scientific value of clear empirical generalisations, thus expressed in the language of mankind, that I venture to subjoin his authority on this point :—" The classifications rudely made by established language, when retrenched, as they almost always require to be, by the hand of the logician, are often in themselves excellently suited to his purposes . . . . . The established grouping of objects under a common name, though it may be founded on a gross and general resemblance, is evidence, in the first place, that the resemblance is obvious, and therefore considerable; and, in the next place, that it is a resemblance which has struck great numbers of persons during a series of years and ages. Even when a name, by successive extensions, has come to be applied to things among which there does not exist this gross resemblance common to them all, still, at every step in its progress we shall find such a resemblance. And these transitions of the meaning of words are often an index to real connections between the things denoted by them, which might otherwise escape the notice of thinkers—of those, at least, who, from using a different language, or from any difference in their habitual associations, have fixed their attention, in preference, on some other aspect of the things. The history of philosophy abounds in examples of such oversights, committed for want of perceiving the hidden link that connected together the seemingly disparate meaning of some ambiguous word."* The scientific and practical relations of body and mind have been found difficult of investigation mainly from the causes so sagaciously indi-

* *System of Logic*, 4th edit. p. 173.

cated by Mr Mill; and it will be one of my objects to show how much of profound truth is to be discovered in some general terms in common use.

The experience of man, as shown in the laws of society, is but the concrete form of that knowledge of which language is the expression. It therefore follows the same law of development, and may be formularised after the same method. In the paragraph from which I have just quoted, Mr Mill indirectly indicates this conclusion by indicating the analogy. "The classifications rudely made by established language, when compared with the classifications of a philosopher, are like the customary law of a country, which has grown up, as it were, spontaneously, compared with laws methodized and digested into a code: the former are far less perfect instruments than the latter, but, being the result of a long though unscientific experience, they contain a mass of materials which may be made very usefully available in the formation of the systematic body of written law."* This experience, on which both the customary and written law are founded, comprises that knowledge of human nature which, when formularised into general propositions, constitutes the empirical laws of a science of human nature. The analogy as to development from experience of both laws and language is close and direct. But both have equally their roots deep in the laws of human nature. "The laws which hold society together," Professor Ferrier observes, "operate with the force of instincts, and after the manner of vague traditions, long before they are digested into written tables. The written code does not create the law; it merely gives a distinct promulgation and a

* *Loc. cit.* p. 173.

higher degree of authority to certain floating principles, which had operated on people's practice antecedently. Laws, in short, exist, and bind society, long before they exist as established, or even as known laws. They have an occult and implied influence before they obtain a manifest and systematic form. They come early in the order of nature, but late in the order of knowledge; early in the order of action, but late in the order of thinking; early in the order of practice, but late in the order of theory."*

The third source of our knowledge of human nature is to be found in the general rules of conduct of individuals. These, of course, vary much under various circumstances, and are liable to be erroneous from various causes. But this is certain, that in proportion as a rule is general, in that proportion it is true. For example, while multitudes of men *believe* in fairies and ghosts, the alleged *experience* of such beings is limited to a few only, and that limited experience is found, on inquiry, to be erroneous. But whatever may be the belief as to the existence of such beings, or however great the admitted experience, no man in his senses had ever such experience of himself, or of his relations to the external world, that he concluded he was a fairy or a ghost, and made the conclusion a rule of life.

Now, none of these sources of knowledge are of themselves sure sources. Law is sometimes founded on the conclusions of a false philosophy, or the dogmas of a false religion; language is often corrupt, or expresses only beliefs and conclusions which (as we have just seen) may be wholly erroneous; and the conduct of mankind, as individuals, is often under the influence of these beliefs, and conclusions, and laws. But it is rarely

* *Institutes of Metaphysic*, 1st edit. p. 14.

that they are all erroneous together. It is therefore only the principles inductively attained to by experience, from which errors have been carefully eliminated, that can be deductively applied to experience in any practical science, but more particularly such a science as that of human nature, in which, by their very nature, the subject-matter of the science and its phenomena are of the highest degree of complexity. In the science of astronomy, so comparatively simple an error in deduction from experience as to the fixity of the earth that was made from the apparent motion of the sun in space, led to a bewildering complexity of cycles and epicycles, and for a long period hindered the progress and practical uses of the science. In transcendental metaphysics, there are fundamental errors far more complex and more fatal. This elimination of error from the deductions of experience is itself, in truth, an instinctive and necessary mental process. If, in the ordinary act of perception, an individual were to trust to the experience gained through one sense, it would be fallacious; he therefore unconsciously and instinctively corrects the impressions derived through one sense by those derived through another. If he were to trust wholly to the notions thus reached, he would still be liable to error; but to avoid these, he instinctively compares the notions thus reached with those attained in time past, or, in other words, he corrects present by past experience, and so attains to more correct results. Whenever, from disorder or disease of the nervous system, a man fails to carry on those processes of verification, mental disorder arises, and all true knowledge ceases to be attained. In those induced states of the brain termed "electro-biological," in dreaming, and in insanity, we have forms of disordered consciousness in which this instinctive correction of the impressions on the senses

and the thoughts is wholly or partly interrupted. Thus it is with the deductions from the experience of mankind. It is necessary to the elimination of error that the observations from which the deductions flow be in the first instance compared, and the necessary corrections made; then these corrected results must be compared with the recorded or acquired experience of mankind, so that the deductions may be either modified, corrected, or confirmed. This being done by the philosopher in his researches, and as a scientific process, experience next tests the practical value of the deductions or principles so acquired, by applying them to the wants and necessities of mankind. In national affairs—that is to say, in practical sociology, a science necessarily based on psychology—this is the method constantly pursued, at least in this country. Every act of parliament is the result of this process; and, when brought into operation, has still to undergo the test of experience, so that its imperfections may be detected. And in proportion as an individual or a nation seeks to extend and purify knowledge thus obtained, by the elimination of error and the tests of experience, in that proportion the individual or the nation is progressive in all that leads to happiness and wellbeing.

There is yet another important caution to be had in mind in thus deducing from the corrected experience of mankind the fundamental principles of a practical philosophy—namely, that all principles otherwise attained should be excluded; or, in other words, that in a practical science it is both useless and dangerous to take cognisance of merely speculative propositions, whether it be with a view to apply them, or to determine whether they be true or false. The contrary course in sociology has been fertile in disastrous results to entire

nations—in philosophy, to mankind in general. We must therefore bear in mind, that if speculative propositions, even when determined to be true, are found to have no present practical value, they may be wholly laid aside from consideration. We will not even commence the discussion of such, as the discussion itself is injurious to progress, by turning the mind from those principles which are of real present value because of present practical application.

With a view to the illustration of these doctrines (for it is of importance they should be thoroughly comprehended and admitted), let us examine the important psychological proposition that there are ghosts; or, in other words, that human souls, existing in a disembodied state, appear on earth to men in the corporeal form, and even the dress of life. Such a belief is so widely extended amongst mankind, that there is perhaps no tribe or race of men who have it not in one shape or another; while, like the equally general belief in a future state, it enters largely into the doctrines of all forms of religious culture. Of late years it has given rise to the sects of the Spiritualists, &c. It contains an element of truth, with elements of error. It is founded upon the conviction that the spiritual life of man ceases not with his terrestrial life; this is the true element, just as in the idea that the sun moved round the earth, there was the true element that motion was manifested in the phenomena. But the erroneous element in the popular idea of ghosts is, that the spiritual life of the disembodied soul may be again manifested terrestrially in terrestrial form, with transient mundane habiliments. Now, experience could correct the error of observation in the numerous alleged instances of apparitions upon which the deduction rests; and philosophy might prove most conclusively,

that such a phenomenon as a visible soul dressed in mail, or coat, or gown, is of impossible occurrence: still, unless the experience were enlightened so as to perceive the fallacy in the observations, and the judgment informed so that the philosophical argument could be comprehended, the individual's belief in the truth of the proposition would not be shaken; and this is in fact the position of multitudes. They have not the necessary knowledge of the structure and functions of the nervous system to enlighten their experience, nor are their minds sufficiently trained in habits of correct thought to appreciate the arguments. But a practical psychology ignores the proposition altogether, as a first principle, on other grounds. Ghosts appear so rarely, if at all, and, when they are alleged to appear, being equally as harmless as other creatures of the imagination, they can neither be studied nor estimated practically; and the proposition, if true, is useless. If, however, we turn from the convictions of individuals to the common sense of enlightened nations—that is, to enlightened experience—and inquire to what extent the proposition is operative as a principle of practical philosophy applied to sociology, we see that it is in fact wholly inoperative, and has hardly a place therein. Amongst such nations, there are none of the useful arts guided by any such principle; and, especially, no legislation for ghosts, except when the fallacious belief in their existence is applied by knaves to fraudulent purposes. While, then, as a speculative proposition, it is useless even if true, it is practically pronounced by the enlightened experience of mankind to be false. That ghosts do not exist, is therefore a fundamental proposition in practical psychology, irrespective of all speculative arguments; consequently all deductive propositions, whether theoretical or prac-

tical, flowing from the contrary doctrine, are wholly rejected.

It is then from the experience of mankind, corrected by enlightened observation and inquiry, that all the fundamental principles of a practical philosophy must be deduced. So deduced, they are but empirical laws, or laws of experience; that is to say, the general expression of the necessary order of phenomena, without need of reference to the first cause or causes of that order. The necessary order being known, it can be anticipated or modified, and thus a practical science developed from those laws.

SECT. III.—*The Method of Determining the First Principles of a Science of Mind by Observation and Induction.*

Let us now advance a step in our method. We have seen that the fundamental error of philosophy and physiology consists in an examination of the phenomena of Thought out of relation to the phenomena of Life and Organisation (p. 38). It is necessary, therefore, to determine whether the correlations of Life and Organisation with Thought can be detected by scientific methods in these sources of knowledge.

Many of the most comprehensive general terms of language in common use contain generalisations as to vital and mental phenomena which are scientifically correlative. Thus, the word "animal" connotes attributes common to that class of organised beings to which man belongs, and indicates, therefore, that there is a general law or laws applicable to animals which the general experience of mankind has instinctively detected and expressed in the word. So "Life" expresses some attributes still more general, since the term includes both

animal and vegetable life. "Life," connoting the attributes common to all organisms, animal and vegetable, expresses the differences between two classes, as well as the attributes common to each class. "Instinct" is another word of like value. We speak of animal instincts, of vegetable instincts, of human instincts. Hence, Instinct is a word which is correlative with Life, and indicates a mode of life common to all organisms, whether animal (including man) or vegetable. Consequently there is some general law expressed as to the manifestation of vital phenomena termed instinctive, which only requires to be formularised to be made capable of deductive application as a scientific principle to the explanations of the instincts. "Mind" is another general term of the same kind. We speak of the mind of God, of the minds of inferior animals, of the human mind. Hence the term connotes some attributes common to all these which the experience of mankind has discovered and generalised, and which, when formularised into a general law, can be made applicable, deductively, as a scientific principle, to all mind. "Organisation" is another term of this kind, full of the greatest significance, although rather scientific than popular. Every living thing is organised—that is, constitutes a whole of mutually related parts. Society is an organisation of individuals, having mutual relations and duties; the world and the planetary system to which it belongs constitute a whole of mutually related parts. Hence ancient philosophers designated the world an animal. It is clear, therefore, that in the use of these terms some general law or principle is expressed, which includes all the phenomena of both Life and Thought, and that a true scientific method should enable us to seek out and discover that general law.

Let us now suppose that by such a method the experi-

ence of mankind has been brought into comparison with the inductive propositions of an empirical psychology, the deductions of a pure metaphysic, and the facts and conclusions of physiology, or the doctrines of the vital forces; another step will have to be taken, namely, the reduction of the results of our inquiry to some general principles, and an exposition of the applications of these principles to the sciences of human nature. Without this final generalisation of our inquiries, our procedure would be incomplete; and without an application of the principles arrived at, the whole method would be but imperfectly understood and developed.

The highest application of the fundamental principles of a mental science, is to that department of the science of human nature termed the moral sciences. These have for their foundation the laws of society; but the laws of society are based upon the nature of man as he exists. Mind, in its highest manifestation, is that which determines the order of society, or the harmonious relations of individuals to each other. Social laws must, as to society, be necessary laws; for without them society cannot exist, or, if they be not executed, must cease to exist, or, in other words, be disorganised. Mind, therefore, is in the nature of a force of nature.

Now, we have seen (p. 88) that the laws of the physical forces must correlate the laws of the vital forces, and these latter the laws of thought; but, to complete our inquiry, we must show how these laws of thought correlate the physical forces of nature. In our cognition of human laws, we recognise an element not yet allotted to the great physical forces of nature. We have in both an order of events to be followed, expressed in the law, as the law of gravity; and we recognise an ultimate force, which compels, if need be, to the order; but we have as

a fact of experience in human law, that the order is designed with regard to certain ends to be obtained—that there is a meaning in the law, namely, that certain results shall follow upon the order of events, as the object of the law. We also have as a fact of experience, that the design is due to a designer, or designers; in other words, to thought or mind in act, for design is the special attribute of mind.

Passing, then, to an examination of the great uniformities of nature and the laws of the physical forces, and to the phenomena of life and organisation due to those forces which we term vital, do we recognise in them a design and a designer? As a question of experience, there can be no doubt that, as to a vast variety of phenomena, there is a recognised end aimed at in the order in which they occur. No one doubts, practically, that ends are aimed at in organisation. For example, it is certain that the lungs are constructed or developed for the express purpose of bringing air into relation with the living tissues; and that all living tissues, whether in plants or animals, which have this office or function, and attain the end aimed, are of the nature of lungs; that lungs are not used to attain the same end as bones, or brain, or as the limbs generally. No one doubts that the stomach is expressly adapted to attain an end, namely, the reception of alimentary stuff, and its transformation into something else, so that it shall be added to the blood in a fit state—that is to say, in a state adapted to the end for which the blood receives it. And so also of the functions of organs in relation to each other. In Life and Organisation, the whole of the phenomena are in such order that a definite end, or the final cause of the phenomena, shall be obtained, namely, the continued existence of the organism in time and

place. In the phenomena of Mind and of modes of Existence, adaptation to ends is therefore the great law, and that whether we consider those of instinct alone, or the more complex phenomena of human actions. In instinct, the adaptation of the corporeal structures to the needs of the organism is an inexhaustible theme of curiosity and delight to the naturalist, and, indeed, is so wonderful, that it has been believed so far to exceed the adaptation of the human reason, as to be attributed to a something divine. In human actions, the *motives* to action are always the objects of anxious inquiry—that is to say, what are the ends aimed at by the individual? Reason itself is but a knowing adaptation of means to ends; and all Art is nothing more than science in its practical applications, as a knowledge of the means by which certain ends are or may be reached. "Art in general," Mr J. S. Mill remarks, "consists of the truths of science arranged in the most convenient order for practice, instead of the order which is most convenient for thought. Science groups and arranges its truths so as to enable us to take in at one view as much as possible of the general order of the universe. Art, though it must assume the same general laws, follows them only into such of their detailed consequences as have led to the formation of rules of conduct, and brings together, from parts of the field of science most remote from one another, the truths relating to the production of the different and heterogeneous conditions necessary to each effect, which the exigencies of practical life require to be produced."* The "Art of Life" is described by Mr Mill as having three departments—Morality, Prudence or Policy, and Æsthetics. "To this art," Mr Mill adds,

* *System of Logic*, 4th edit. vol. ii. p. 525.

"other arts are subordinate, since its principles are those which must determine whether the special aim of any particular art is worthy and desirable, and what is its place in the scale of desirable things. Every art is thus a joint result of laws of nature disclosed by science, and of the general principles of what has been called Teleology, or the Doctrine of Ends, which, borrowing the language of the German metaphysicians, may also be termed not improperly the principles of practical reason."* The ultimate principle of this teleology (this eminent logician adds) is the happiness of not man only, but of all sentient beings.

Now, the term Teleology has also been applied (Mr Mill thinks improperly) to that department of human knowledge which attempts to *discover* the ends aimed at in all the various successions of the phenomena of creation, and which therefore assumes that an end is aimed at in all phenomena. This is the doctrine of so-called "final causes," when the assumption is made the basis of an explanation of the order of phenomena. Many discussions have been raised as to the validity of this procedure, since Bacon first objected to it as sterile in results; none of these have been directed, however, against the method itself, so much as against its abuses. That ends are aimed at in nature is so universal a conviction, that the word "Nature" itself constantly stands, in the language and expressions of both the learned and unlearned, for a something which both designs and acts to given ends.† It is thus used because it expresses the universal experience of thinking men as to the manifestation of order and design in creation; nor, indeed, is it possible to avoid expressing the idea in one form or

* *System of Logic*, 4th edit. vol. ii. p. 527.

† See *infra*.

other, when discussing the laws of things. Thus, in reference to the passage just quoted, as to the origin of Art, it may be stated that no art, being, as affirmed, the result of the laws of nature, can contain what is not in the laws of nature; "yet," Mr Mill remarks, "every art has one first principle, or general premise, not borrowed from science—that which enunciates *the object aimed at*, and affirms it to be a desirable object. The builder's art assumes that it is desirable to have buildings; architecture (as one of the fine arts), that it is desirable to have them beautiful or imposing."* When the object aimed at is attained, we say, that is the result of the art. Now, as every art aims at the promotion of happiness as its ultimate end, and as this is the ultimate principle of Teleology, it follows that, if that be also the ultimate end of Life and Organisation, Teleology, or the doctrine of ends, must be our guide in the development of the first principles of mental science. Or, in other words, the results of the laws of Nature, as ends, must be the great object of our scientific researches into the correlations of Life and Thought. Whether happiness, to use the words of Pope, be "our being's [sole] end and aim," may be questioned on logical grounds; but as a fact of experience, it is surely unquestionable that it is one of the ends; and in truth, when investigating the phenomena of Life and Organisation, it is not possible, for this reason, to avoid the teleological method, as we can when investigating mere cosmic or physical phenomena. We cannot be content with simply determining the mere relations of things or events—an existence, a co-existence, a succession, or a resemblance—and not inquire into the ends thereof. Such a doctrine, applied to physiology, would

* *Op. cit.* p. 526.

in fact arrest all scientific research into the phenomena of life; for the investigation into the so-called functions of organs is nothing more than a teleological investigation. If we do not investigate functions, what can we investigate? for anatomy, as an art, is only of value in as far as it reveals the uses of organs. Again, all disease is a disorder of function: if we know nothing of the function, how can we investigate its disorder? To cultivate the art of medicine, according to the method which the opponents of teleological research insist upon, as the proper method for investigating the phenomena of nature in all cases, would be, in effect, to dispense with all research into either the structure or function of organs, and to found its precepts upon the boldest empiricism; such, for example, would be the Hahnemannic "provings" of the action of remedies, if undertaken by persons utterly ignorant of the anatomy and physiology of the human body; that is, of the structure and uses of organs.

But there is another point of view of this question. The human mind can no more divest itself of the idea of design, as a cause of phenomena, than it can divest itself of the ideas of cause, or space, or time. It is a necessary idea, and therefore a fundamental truth. This is not the place to prove this proposition, nor is it necessary to advance formal proofs; for every intelligent man may establish its truth for himself, either by observing the modes of thought of children, or of uncultivated or barbarous men, or his own mental processes. It is not surprising, therefore, that language contains general terms expressive of man's generalisations as to this universal law of design. Such a word, we have seen, is *nature*. Perhaps the Greek language presents no more striking illustration than the word which is the root of the *term* "teleology." Thus, τελος not only signifies an end simply,

but things existing to an end; or gives origin to verbs indicative of action to an end. In this sense, τελος expresses a legion of soldiers—*i.e.*, an orderly arrangement of men to an end; then that it is a designed series of events (τελλω, *orior*); then the completion of the series, or the end attained, τελεω, *ad finem perduco, perficio*, I finish; and τελειως, *perfectè, absolutè, integrè, plenè;* then that the end or the conclusion of the series is reached, as τελος in the sense of *maturitas virginis*, or the end of childhood, τελευτη, *mors*, the end of the series termed life, or death.

We thus see that the teleological method is a natural method of inquiry, and universally applicable. If we inquire into the history of its applications, we find that it has been either imperfectly or erroneously applied. Erroneously, when the ends aimed at have been assumed hypothetically, and not determined by careful observation and research. Imperfectly, when it has been limited to a particular class of phenomena. Thus Dr Whewell, one of its ablest advocates, remarks that the "idea of a final cause is applicable as a fundamental and regulative idea to our speculations concerning organised creatures only. That there is a purpose in many parts of creation, we find abundant reason to believe, from the arrangements and laws which prevail around us. But this persuasion is not to be allowed to regulate and direct our reasonings with regard to inorganic matter, of which conception the relation of means and ends forms no essential part. In mere physics, final causes, as Bacon observed, are not to be admitted as a principle of reasoning."* Dr Whewell makes this concession, however, with some reluctance; for he remarks that if, in looking

* *History of Scientific Ideas*, 3d edit. vol. ii. p. 247.

at the universe, we follow the widest analogies of which we obtain a view, we see, however dimly, reason to believe that all its laws are adapted to each other, and intended to work together for the benefit of its organic population, and for the general welfare of its rational tenants; and he denies that, as physical science advances from point to point, final causes recede before it. The principle of design is seen in another mode of application, but loses none of its force. We are only "led into a scene of wider design, of deeper contrivance, of more comprehensive adjustments."*

It may be doubted, indeed, whether the authority of Bacon is rightly quoted as opposed to the teleological method. He seems to have objected simply to a speculative, hypothetical, or imaginative process of determining the ends, to the exclusion of observation, rather than to the determination of ends absolutely. This will appear from his own words: "To say that the hairs of the eyelids are for a quickset and fence about the sight; or that the firmness of the skins and hides of living creatures is to defend them from the extremities of heat or cold; or that the bones are for the columns or beams, whereupon the frame of the bodies of living creatures is built; or that the leaves of the trees are for protection of the fruit; or that clouds are for watering of the earth; or that the solidness of the earth is for the station and mansion of living creatures, and the like, is well inquired and collected in metaphysic; but in physic they are impertinent—nay, they are indeed but remoras and hindrances to stay and stop the ship from further sailing, and have brought this to pass, *that the search of the physical causes hath been neglected and passed in silence.*" † This is a protest, in truth, against the *ignava ratio;* for it

* *Op. cit.*, pp. 253, 254. † *Advancement of Learning*, book ii.

is hardly conceivable that Bacon means to say that eyelashes, skin, bones, leaves, clouds, are of *no* use, and exist to *no* purpose, when in fact their uses are obvious. What he means to object against is, the substitution of mere *hypotheses* as to their uses, for inductive inquiry into their causes, or into their natural history, structure, and relations, so that their uses may be determined from the order of the phenomena.

That there is an ever-active tendency to this procedure, is familiar to all who have studied the matter; and that it is injurious to science, by satisfying the mind with fictions, is certain. Kant has placed these imperfect uses of the teleological method in a clear point of view, in discussing what he terms the error of inactive reason (*ignava ratio*). This error arises when we adopt a principle of inquiry which requires us to regard our investigations of nature as absolutely complete. This error we have already referred to as an obstacle to the progress of mental science (p. 48, *sqq.*) Such a principle is adopted erroneously in teleology, when we assume the Supreme Mind to be a constitutive, and not a regulative principle in nature. We thus make the investigation of causes a very easy task, by directly referring such and such phenomena to the unsearchable will and counsel of the Supreme Wisdom, while we ought to discover their causes in the general order and laws of their occurrence. "We are thus recommended," Kant observes, "to consider the labour of reason as ended, when we have merely dispensed with its employment, which is guided surely and safely only by the order of nature and the series of changes in the world, which are arranged according to immanent and general laws."*

* *Kritik der Rein: Vernunft.* The Natural Dialectic of Human Reason.

These arrangements, it is true, have an end merely in relation to each other as constituting a whole, or a systematic unity. The principle of *final* unity, therefore, is that alone which guides us teleologically. Hence, all that we ought to do in scientific research is to follow up the physico-mechanical order of phenomena, so as to determine the general laws of their relations to each other, with the hope of discovering the teleological connection also, or the *reason* of those relations.

Another imperfect application of the teleological method may be mentioned, namely, the limitation of it to the determination of good ends. This is, indeed, the most common mistake that is made. Men having formed an idea of what is good or evil morally, are always looking for a moral purpose in the order of nature, and have built up hypotheses as to the moral ends which the Deity has in view in that order. The result has been interminable disputations and disquisitions as to "Evil," "Necessity," and the like, which, turning upon mere hypotheses and speculations, and not upon facts, lead necessarily to no conclusions. If we would attain to a true knowledge of these things, we must wholly abandon these metaphysical speculations as "barren virgins;" and, using the teleological method rightly, discover the Divine counsels, so far as that is possible, by observing the ends attained, and classifying them; or, in other words, determine the results of uniform successions, coexistences, and the like.

We should thus be enabled, while we were determining these results, to determine the laws of mind, considered as an ordering force in creation. From this point of view, teleology would be something more than a questionable doctrine of "final causes," inasmuch as dealing

with Mind as an ordering force, it would be strictly the science of MENTAL DYNAMICS.

Having thus a clear conception of the true nature of teleological research, we can the better understand how we can extend its applications so as to pass beyond the correlations of Life and Thought, and examine satisfactorily the correlations of Mind, considered as an ordering force, with the great physical forces of nature. Such an investigation is not only necessary to bring our knowledge into unity, but also to our practical object, namely, the building up of a practical science of human nature, and which, as we have seen already (p. 103), must be based on a correlation of the physical and vital forces with Mind. It will not, however, satisfy the requirements of our method to stop here, and rest solely on the results attained by this extension of the teleological method. On the contrary, it must be so developed that the principles it educes must be demonstrably conformable with both the inductions of science, and the experience of mankind. In other words, those principles must be subjected to the double proof required to establish all general principles whatever (p. 89).

SECT. IV.—*Summary of the Method.*

If, then, we reconsider the preceding doctrines, with a view to a practical development of our proposed method, we shall find that there are three stages or steps by which it may be carried into effect. First, we shall have to inquire into the general and scientific experience of mankind as to their states of Consciousness (Empirical Psychology); next, we shall have to examine into the fundamental laws of Existence (Ontology); and, thirdly, into the first principles of Mind as an ordering force to ends

(Teleology, or Mental Dynamics). In the first, we examine Consciousness in relation to vital phenomena; in the second, Existence in relation to vital and physical phenomena; in the third, we develop the great correlations of Mind with the physical and vital forces considered in relation to design in creation, viewed as a systematic unity, or the doctrine of Ends. This will bring the highest manifestation of mind—as a creative and regulative power—into synthesis with creation, and consecutively into synthesis with the human mind. Here, the method will show that the ideas of the Divine Mind, as revealed in the phenomena of creation, are none other than the fundamental ideas and *à priori* conceptions of the human mind as revealed in consciousness; that the ends aimed at and attained by the Creator are the objects of the instinctive desires of the creature; and that, consequently, the phenomena of nature constitute a reflex of the human mind. Or, to use the words of M. Agassiz, "the whole universe may be considered as a school in which man is taught to know himself and his relations to his fellow-beings, as well as to the First Cause of all that exists."* In this way we shall have completed the task which we proposed at the outset (pp. 87–90)—namely, to develop a method of philosophical inquiry which should combine the three great departments of human knowledge into unity, and attain to a knowledge of human nature, not empirically only, but deductively, through principles derived from the entire range of all science. Such principles being established, they can be applied deductively to the development of each department of philosophical culture. In establishing these principles, I shall show their general applications to Metaphysics,

* *An Essay on Classification* (1857), p. 8, note.

or a science of the fundamental laws of Thought; to Biology, and the entire group of Natural History Sciences; and to Sociology; and then proceed to develop more especially the scientific basis of a mental Physiology and Organology, and their bearings upon Medical Psychology and Mental Pathology. The whole will thus be a philosophical, scientific, and practical exposition of the fundamental laws of Life and Thought in their correlations. As such, it will constitute a solid basis upon which the metaphysician, moral philosopher, political economist, biologist, zoologist, and medical practitioner, can alike build up their respective departments; and at the same time be a starting point for the man of general culture, who wishes to study human nature under all its multifarious aspects. Such a wide field of inquiry must necessarily be passed over cursorily; errors, too, are inevitable, from the very nature of the subjects considered: still, I indulge a hope, that the views I shall set forth, however imperfectly, will contribute, in some degree at least, to the building up of a true philosophy on the solid basis of observation and induction, and be of practical use.

PART II.

METAPHYSICS.

Metaphysic, in the ordinary sense of the term, includes both Psychology and Ontology. The one discusses the laws of Consciousness and Thought, the other of Being. Metaphysic is founded upon experience, in so far as it is founded on the phenomena of Consciousness; but it is speculative in so far as the solution of the problems involved is attempted by *à priori* reasonings rather than by inductive processes.

DIVISION I.

GENERAL PRINCIPLES OF EXPERIENCE.

CHAPTER I.

MATTER AND MIND.

1. A Human Being feels himself, on investigation, to be one, yet of a twofold nature, or constituted of two distinct elements. He intuitively distinguishes himself from all other things around him and not of him, which to him constitute the external world. As one, he thinks and speaks, and calls himself *man*—an ancient Sanscrit

word meaning *to think*, and the root of the Zend word *manthra*, *speech*.* And just as he intuitively distinguishes the external world from himself, so he separates that part of himself which feels internally, as a subject, from that part of himself which he perceives externally in space—an object. He sees and touches his own limbs and trunk, and sees the eyes, and ears, and face of other men like himself. He feels that he moves his limbs, and trunk, and face, and uses his eyes and ears: these constitute, as a whole, his body. Now to him, that which sees, touches, and causes motion, is one thing; that which is seen, touched, and moved, is another. The one is the agent, the other the object. He distinguishes these by names; and the agent, or that which feels and acts, he calls soul or mind; that which is acted on or moved, is body or matter. The individual is one in a natural "Dualism." Thus Sir W. Hamilton remarks: "The veracity of consciousness in the fact of perception [*i.e.*, the accuracy of our intuitive knowledge of our existence] being unconditionally acknowledged, we have established at once, without hypothesis or demonstration, the reality of mind and the reality of matter; while no concession is yielded to the sceptic, through which he may subvert philosophy in manifesting its self-contradiction. The one legitimate doctrine thus possible may be called *natural realism*, or *natural dualism*."†

2. Next comes the question, what is the nature of matter, and what of mind? Here again experience gives what appears to be a simple solution. Matter is not mind, just as mind is not matter. Mind is therefore

* Professor Max Müller. *History of Ancient Sanskrit Literature* (1859), p. 21, note.

† *Supplementary Dissertations to Reid's Works*, note A. (On the Philosophy of Common Sense), p. 746.

*im*material, and that which we *cannot* touch, handle, see, feel, and the like. On the contrary, matter is that which we *can* touch, handle, see, feel; and since we experience certain changes in our consciousness when we thus examine matter to which we give names, we connect those changes causally with the thing handled, touched, and the like, and we say they are due to the *qualities* of hardness, extension, weight, coldness, warmth, and the like—which names indicate the changes in our consciousness. These causes of change we conclude to be inherent in the thing touched, inasmuch as without them we experience no sentient changes, and have no knowledge of matter, or of the thing we term material.

3. Now philosophers have raised many discussions upon these and other notions, as to the nature, qualities, and properties of matter, which are to be found in works on philosophy and metaphysics; but mankind in general have had little difficulty in deciding what is mind and what is matter. Not only can the one be compared with the other, and the differences be thus established, but one kind of matter can be compared with another, and *their* differences established, almost *ad infinitum*. It is not so with mind, however, inasmuch as it is only strictly cognisable by the inner sense of each individual man alone. Nevertheless, as it is impossible that the act of comparison should not be made, and the similarities and differences noted, man compares, firstly, what he *does* as an intelligent being—that is to say, his actions—with the actions of other animals who seem, like him, to be intelligent, and with the results of that Divine intelligence which he sees operative in creation. Secondly, He compares what he *is* as Being, with what he sees in creation. Now the result of these comparisons are numerous and complex. The comparison with the Divine Intelli-

gence is twofold: First, Man likens it to himself. Hence the Deity, from this point of view, is anthropomorphitic. Secondly, He likens his own mind to the Deity, and then concludes that he is in the image of God. The comparison with lower animals has led to such a variety of doctrines, religious and philosophical, that even a catalogue of them would be wearisome. It is enough to say that the doctrine of metempsychosis, which identifies the soul of animals with the soul of man, so widely spread over the world, is the chief of them.

4. The comparison with matter has led to the results which most interest us, inasmuch as from it has arisen the greater number of the terms by which mind is designated in various languages. Man, feeling that there is something within him distinct from the body, and having an instinctive conviction that that something will continue after the body ceases to exist as a body, sought to liken it to something external, with points of similarity. Now, the only thing in the qualities of which there was found any similarity or likeness is *air*. It differs from that usually termed matter, and is like mind in *not* being hard, extended, visible, heavy (to the touch), and the like; yet, like mind, it has power to move. *Soul* is one of several words in various languages which express this similitude of mind to air. *Psuche*, *pneuma*, in Greek; *spiritus*, *anima*, and *animus*, in Latin, the two latter derived from the Greek word for air (*anemos*); *ghost*, *ghaist* (Scotch); *gheist* (German), from "gas," or the same root; *nepesh* and *ruach*, Hebrew for soul and spirit; and *atmā* (Sanscrit), analogous to, and the root of, *atmos* (Greek); which again is the root of "atmosphere," vapour, or air. These are all cognate terms, and are either derived from words which signify to *breathe*, *air*, *breath*, or have that signification primarily.

They indicate a doctrine as to the nature of this unknown basis, which was common to the entire East, and perhaps to the entire civilised world, from the earliest periods.

5. The influence of this doctrine, and of the notions connected with it, is to be found in the earliest Biblical and Sanscrit literature. The word *âtman*, which in the Veda occurs often as *tman*, means life, particularly animal life, or the vital principle, and is compared with the sap of plants. Most frequently, however, *tman* and *âtman* are employed in the sense of *self;* just as we say, "My soul praises or rejoices, for I praise : I myself rejoice." This is the most usual signification of *âtman* in the later Sanscrit, where it is used like a pronoun. Yet *âtman* means there also the soul of the universe—the highest soul or self (*paramâtman*), of which all other souls partake, from which all reality in this created world emanates, and into which everything will return. Thus, a Hindu speaking of himself (*âtman*), spoke also, though unconsciously, of the soul of the universe (*âtman*).*

6. This ancient doctrine, except when thus refined into a comprehensive metaphysical notion of power, was essentially materialistic, inasmuch as, applied to *physiological* phenomena, it taught that both life and thought depended upon a gas or air, or a gaseous æthereal substance, which circulated through the arteries or "air-carriers," and was derived from the brain; and that the soul could and did assume a material, albeit gaseous or æthereal, form after death. It therefore entered largely into the metaphysics, physiology, and mythology of the most ancient nations, as well as the most uncivilised. To this day it is the doctrine universally popular, and constitutes, in its most

* Prof. Max Müller. *A History of Ancient Sanskrit Literature* (1859), p. 20.

materialistic development, an essential portion of the creed of by far the largest part of Christendom.

7. This doctrine is, however, no longer current as a physiological doctrine in the schools of medicine, physiology having ceased to recognise the ventricles of the brain as the seat of the "spirits," the arteries as their conduits, and the nostrils as the ducts through which the brain draws them in; nor is it recognised by modern philosophy, or the advanced theologians. It is found, indeed, to be not only wholly incompatible with the highest truths, but to be more practically mischievous than the grossest scepticism. Professor Ferrier has exhibited the consequences to which it leads in the most striking and vigorous terms, in reference to the extraordinary delusions of "spirit-rapping." "The word by which the thinking principle is designated in all languages," Mr Ferrier observes, "bears evidence to the inveteracy of the superstition that the conception of mind might be formed by conceiving a material substance of extreme fineness and tenuity. Many circumstances have conspired to keep this fanaticism in life. The supposed visibility of ghosts helps it on."*

8. Although the materialistic element has been eliminated from philosophy, the modern theories generally retain the doctrine that there is a separate *Ens*, or thing, —a *particular* immaterial something—to which they apply the old terms. I must exempt Professor Ferrier's views from this statement, who argues with great logical depth and acuteness that, as a *particular* immaterial thing, mind is wholly incognisable.† Modern Psychology implies, moreover, throughout, that there is not only a particular separate thing, but that the nature and

* *Institutes of Metaphysic*, 1st edit. p. 224.

† *Op. cit.* pp. 230–32.

laws of its existence may be, and indeed ought to be, investigated apart from the body (p. 48). The definition which Sir William Hamilton gives of the science is conclusive as to this point. He says—"Psychology, or the Philosophy of the Human Mind strictly so denominated, is the science conversant about the phenomena, or modifications, or states of the mind, or Conscious-Subject, or Soul, or Spirit, or Self, or Ego."* As to the "mind," we learn that "since Descartes limited psychology to the domain of consciousness, the term *mind* has been rigidly employed for the self-knowing principle alone. Mind, therefore, is to be understood as the subject of the various internal phenomena of which we are conscious, or that subject of which consciousness is the general phenomenon."† As to the word *subject*, it "is used to denote the unknown basis which lies under the various phenomena or properties of which we become aware, whether in our internal or external experience."‡ "But the philosophers of mind have, in a manner, usurped and appropriated this expression to themselves. Accordingly, in their hands, the phrases *conscious* or *thinking subject*, and *subject* simply, mean precisely the same thing; and custom has prevailed so far, that, in psychological discussions, *the subject* is a term now currently employed throughout Europe for *the mind* or *thinking principle*."§

9. Now, although it is usually acknowledged that we know nothing, and can know nothing, of the nature of mind, and are thereby preserved from the rude materialistic comparisons of the early periods of metaphysics, nevertheless we seek to know something, according to the instinctive method of comparison; and we still compare it with what we know. Modern research, especially

* Sir William Hamilton. *Lectures on Metaphysics*, vol. i. p. 129.
† *Ibid.* p. 156. ‡ *Ibid.* p. 149. § *Ibid.* p. 158.

in chemistry and physical astronomy, has developed definite notions of the forces of matter, and we can compare mind with these. That comparison leads us to the conclusion that mind is that which has the power of beginning motion; matter has not the power: mind is that which feels and thinks; matter does not feel or think: mind adapts events to designed ends; matter is adapted to ends: mind is conscious; matter is unconscious: or, finally, since all these are included under consciousness, Mind is Consciousness. This conclusion as to the nature of mind, in comparison with matter, is the foundation of various modern systems of philosophy, commencing with Descartes. The forces of matter and of mind have been and are held wholly apart. What, however, is the fact, as proved by the experience of mankind? Are they wholly distinct? and, if distinct, are they to be held wholly apart in all investigations as to their nature, and qualities, and properties, respectively? To answer these questions, it is necessary to inquire especially into the nature and limits of consciousness, and, firstly and primarily, into the relations of consciousness to Existence or Being. If Beings manifest all the phenomena we attribute to mind, although not conscious, then mind must be the cause of Being, and therefore of something more than consciousness.

CHAPTER II.

CONSCIOUSNESS OR EXISTENCE—THE NATURE OF LIFE.

10. In consciousness, man has a personal experience of his *existence*—that is, of his continuous being in space,—of standing out, as it were, from every other thing in space. Greek, σταω, στω, ἵστημι; Latin, *sto*, *sisto*, *existens*. He discriminates that which stands out visibly, tangibly, as his body—*bodyge*, Anglo-Saxon, stature; *leib*, German.

11. Now, the body is matter, but it differs from other matter in various properties or qualities—that is, as to the various modes in which it affects the consciousness, as a thing apart from and external to the consciousness. But matter is presented to the consciousness under conditions similar to that of the body, that is, there are other men, and other organisms like men in general qualities, namely animals; and other organisms like animals in mere general qualities, namely vegetables. Now, the qualities of these organisms are generalised under the term Life, and the matter of which they are constituted is termed living matter. Life is therefore a necessary quality of the matter which constitutes our bodies, *i. e.*, ourselves; and since our existence ceases when those qualities disappear which we generalise under the term Life—that is, when we cease to stand out or be present in space—Life and Existence are correlative terms. Man has a variety of experience as to animals in general, which he has derived and generalised from

observation of those of their mental and vital phenomena in which their nature resembles or differs from his own. This experience, crude and erroneous at first, has nevertheless been made available from all time to his daily needs; and the experience and the principles deduced therefrom being corrected (*i.e.*, errors eliminated by scientific research, p. 101), constitute the facts and principles of Physiology, General and Comparative, and through that of practical medicine. Thus man, in common with all other animals, breathes the atmospheric air, and eliminates from it the oxygen contained therein; hence the deduction that the vital processes in man and in lower animals—in so far as the uses of oxygen are involved—are identical; and so it follows, that researches in lower animals as to the uses of oxygen may be made available to the elucidation of its uses in the body of man. Not otherwise is it with the classification of mental operations. We can follow no other method than to inquire and observe carefully in what respect those of other living things differ from and resemble man, and generalise the differences and resemblances; taking care to select such differences and resemblances as are real.

12. Let us look, then, at the generalisations and deductions of the common sense and experience of man, as to the conditions of his Existence, or life, in common with animals generally. It is obvious to all thinking men, from experience alone, that man is subjected to the same general laws as those which govern the actions of many other animals. He comes into existence in a similar way, that is, by parentage; grows and is developed into perfection according to similar laws; lives, is nourished, and reproduces his species according to similar instincts; dies and disappears under similar physical conditions. And the common sense of mankind extends these

generalisations, recognises this brotherhood in existence with all organisms whatever, and classes all organisms, whether vegetable or animal, conscious or unconscious, rational or irrational, in one class of things,—viz., those endowed with life, or subjected to vital forces. So that Life is the expression of the fundamental principle that they are all governed as "living matter" by the same general laws. And when man makes of these lower organisms his dear companions, his fellow-labourers, his defenders, his attached friends, and enacts laws in their favour, and for their protection from injury—thus taking them, as it were, into the circle of human society—he but in diverse ways practically asserts the fundamental principle, that, as beings, they have a nature *generically* identical with his own, although *specifically* different.

13. Now, the speculations of mankind as to the nature and cause of Life, or Bodily Existence, have been wholly like those as to the nature and cause of Mind. It being a familiar fact that Life ceases in man and other animals with the cessation of respiration, the inference was obvious that air is the cause of Life, and that something of the nature of air circulated through the body and maintained life. Hence, the term *anima* indicated the cause of Life as well as of consciousness; and from *anima* is derived the term *animal*, as expressive of a large class of Beings, believed to have, in common with man, consciousness or feeling, as well as Life. The doctrine is of high antiquity; but a difference was drawn between the souls of men and of brutes. "For that which befalleth the sons of men befalleth beasts; even one thing befalleth them; as the one dieth, so dieth the other; yea, they have all one breath [*ruach*], so that a man hath no pre-eminence above a beast. All go unto one place; all are of the dust, and all turn to dust again. Who knoweth the spirit

[*ruach*] of man that goeth upward, and the spirit [*ruach*] of the beast that goeth downward to the earth ?* *Ruach* here means both breath and spirit (4), and is translated in this passage in both significations. Amongst the Greeks, the doctrine of Aristotle is the most complete as to the dependence of Life and Consciousness upon a common cause. He says—"Some writers maintain that the *Psuche* is divisible, and that by one part it thinks, and by another feels desire; but what then, if it be naturally divisible, holds *its* parts together? Not the body, certainly, we answer; for the *Psuche*, on the contrary, holds it together, as, from the moment of its departure, the body expires and decays. If there be a something that makes it one, that something is in the strictest sense the *Psuche*. . . . . But the living principle in plants seems to be a kind of *Psuche;* for animals and plants alike partake of it, and it is separable from the sentient principle, but yet without it no creature can possess sensibility." † And again—"Let it suffice for the present to say that *Psuche* is the source of the nutritive, the sentient, cogitative, and motive faculties." ‡

14. The phenomena of Life have been usually attributed to some special but unknown cause, variously designated. A theory of Life founded on the hypothesis of the "animal spirits," was most common amongst Arabic and mediæval physiologists; in later years, theories of a "plastic nature" "Archæus," "vital principle," "*vis nervosa*," have also been current, with much the same result in all cases. In modern times, Stahl took the lead in resusci-

* *Ecclesiastes*, chap. iii. ver. 19–21.

† *Peri Psuches*, book i. chap. 5. (Dr Collier's translation.)

‡ *Ibid.* book ii. chap. 2. Dr Collier has translated *Psuche* by "vital principle," other writers, by "anima;" I have preferred retaining the original word.

tating and applying to the explanation of modern facts in anatomy and physiology, the Aristotelian doctrine which attributed Life and Thought to a common cause. He thereby gave a great impulse to mental physiology, although his views lost ground quickly with the advance of neurological research, and the more materialistic views of the last century (p. 44). Of later years, the doctrine has been developed principally in Germany, and mainly from the fact that the German physicians started from the doctrines of Leibnitz rather than of Descartes, as to the relations of Consciousness to Being. While the latter made unceasing consciousness necessary to life, the former admitted that there were mental modifications without consciousness. Hence continuous consciousness, not being necessary to Being, was not held as necessary to continual Being or personal identity. Some British metaphysicians have adopted the doctrine of experience current in Germany. "Thus," Mr J. D. Morell writes, "the soul, as we have shown, is *prior* to consciousness. It exists unconsciously from the formation of the first cell-germ; it operates unconsciously throughout all the early processes of life; it acts unconsciously even in the greater part of the efforts which subserve our intellectual development."* And again,† "The soul is in the whole body, in every part of it, in every nerve; it forms the peculiar essence of humanity, and *with the body it constitutes the reality and the unity of the individual man.* Of physiological writers, Unzer has exhibited this unity in the most striking way, and by the vastest array of facts. (See his *Erste Gründe Einer Physiologie, &c.*) We become most sensible of this if we attempt to draw a line *anywhere* between vital and psychical forces, and find

* *Elements of Psychology* (1853), part i. p. 74.

† *Ibid*, p. 76.

how impossible it is to succeed in doing so. Even in the early unconscious developments of *life*, there is an intelligible purpose manifested, which denotes the presence of a rational principle, although that principle only manifests itself as yet in teleological forms and processes. *Instinct*, again, plainly betokens mind, only in a lower sphere; for all the actions which it prompts are as distinctly impressed with the laws of reason as those which rise above it. Neither is it possible, if we go one step further, to separate the phenomena of *sensation* from those of the physical and vital forces. The conscious and the unconscious sides of the process are so blended together, that it is only by a mental fiction that we distinguish them, and assign a cause to the one different from that which produces the other. If we go upwards from sensation towards the more intellectual regions, each step involves a corresponding action of the nervous system, which gives occasion to the allied mental phenomena as certainly as any other organ of the frame is associated with its appropriate function. And even if we ascend to the autocratic power of the will, still that is only reached by a succession of steps, all involving both thought and feeling, between no two of which we can draw any line of demarcation, so as to say where the vital and automatic processes *end*, and where those of the soul, *par excellence*, begin. The whole, in fact, are so interwoven in producing the result, that they point us of necessity to a primitive unity as the real starting-point of them all."

15. It is thus clearly deducible from experience that consciousness cannot be separated as to Causation from existence or being. Existence is certainly implied in consciousness, but is not dependent upon consciousness. Life and Mind are correlative in consciousness, and

dependent, therefore, upon correlative forces: Knowing and Being have the same cause.* It is upon this point, then, that a true practical psychology must turn. If we maintain the metaphysical definition of mind or the soul, and limit it to states of consciousness, then we must still multiply psychal agents and principles, and speak of the vital principle, Instinct, Consciousness, Sensation, Perception, Reason, Thought, as things fundamentally different, with all the consequent confusion. If we accept a practical generalisation, which comprises all these as modifications of one primary force or energy, then we can extend our inquiries into the nature of mind by both deductive and inductive experiment and observation throughout creation, and simplify a large mass of confused phenomena; and in doing this we should not only attain to an inestimable good, but we should act according to that cardinal maxim of all philosophy—the "law of Parsimony" of Sir William Hamilton—"That substances are not to be multiplied without necessity; in other words, that a plurality of principles are not to be assumed when the phenomena can possibly be explained by one."† Such a generalisation is moreover necessary for the investigation of that vast number of mental phenomena which philosophy excludes from its field of inquiry, and hands over to physiology, namely, those that in man are instinctive and involuntary, or performed automatically and unconsciously. To these belong, in

* I would here refer to Professor Ferrier's series of subtle metaphysical arguments upon this point, as an example of *à priori* conclusions logically deduced from a simple proposition, for instructive comparison with these *à posteriori* inductions from the generalisations of experience.

† *On the Philosophy of Common Sense;* Reid's Works, note A, § 2, p. 751.

fact, some of the highest processes of the human understanding. This generalisation, therefore, if placed only on the humble footing of a hypothesis, should, for a time at least, be admitted to serve the purpose of the inductive inquirer, and especially be made available to a more scientific classification of the phenomena dependent on mind. But in fact it is no hypothesis; it is rather a great truth, rich in great practical results.

DIVISION II.

EMPIRICAL PSYCHOLOGY.

CHAPTER III.

GENERAL DOCTRINES OF CONSCIOUSNESS.

SECT. I.—*Consciousness as the* Ego.

16. THE fundamental principle, that Existence in the order of events precedes Thought, having been overlooked by the great majority of philosophers since the time of Descartes, they have commenced the investigation of the laws of Thought independently of the laws of Life, or Existence. Hence the doctrines of consciousness are founded primarily upon inquiries into how the man feels and knows, without reference to how he exists; in other words, an "immaterial" *Ego* has been accepted as the proper subject of inquiry, rather than the "concrete" *Ego*.

17. Now it is a fact of experience, that the consciousness of oneness, unity, or personality in existence, depends upon the correlation of life and mind. Every man has a consciousness of personality. He knows that he exists continuously as one—*i.e.*, as a unit or an indivisible thing in time and space. He is an individual person throughout. He exists as one and the same in health and in disease; in sleeping and in waking; in consciousness and unconsciousness; in infancy, childhood, youth, manhood, old age. In no two of these, and

numerous other states and conditions, is he exactly the same. Incessant change from moment to moment is the law of his nature; yet with this incessant change he is one and the same person, or individual. The common sense of both the man and of mankind determines, that from the moment of his birth to the last pulse he is one and the same individual man. All law and social order is founded upon the fundamental fact, that on earth this unity of the man never ceases; that his primary constituent elements are never separated so long as he lives. When the unity is destroyed by the separation of his primary constituents (taking these to mean soul and body), the individual ceases to exist as the terrestrial being, man. Such a separation is death. Language seems to associate the same expression of this individuality with life. We have seen that the same word in Sanskrit (*âtman*) which means air or breath, is also used to signify *self* (5); from the same root is probably derived *a-ham* (in cuneiform inscriptions *Adam*), *Ego*, ἐγώ, *ich*—I am, I live, I breathe. Metaphysicians, as we have seen (p. 52), have considered existence and conscious existence as the same; but the experience of mankind is to the effect that the individual is not always conscious of his existence, nor even always conscious that he thinks. He exists, in reference to his actions and passions, in two different and antagonistic states, between which, however, there is every degree of transitional intensity. He feels, and he does not feel; he is conscious, and he is unconscious. Emerging from the womb, he first feels simply, and has no perception of the external world; then perception takes place; next memory, and therewith thought upon the feelings and perceptions; and finally the conceptions, imagination, and reason of the perfect man, are developed.

18. In passing from the unconscious to the conscious state at any period of life, man reaches the full exercise of his powers, whatever those may be, in the same order; so that the awaking from the sleep of healthy life is a transcript in brief of that gradually awakening into mental life, which, commencing with birth, ends in the full development of the mental powers. The terms *mind* and *consciousness* are applied to all these mental phenomena, and include alike the simplest feeling of pleasure or pain, and the highest efforts of the understanding. Consciousness is therefore conditional. It is only when in ordinary health that man, at a certain stage of his existence (not before), acquires this consciousness; *i. e.*, the knowledge that he exists as one and the same in time and space. He arrives at this knowledge by observation and experience, under given bodily conditions. He perceives under these conditions that his existence is continuous; he observes that there is space around him, and a world external to himself. He sees things like himself occupying and moving in the space around him. He separates himself by comparison from all other things in time and space, and designates himself *Ego*, *I*, *me*. He is thus *self*-conscious. Rarely indeed, however, does the man say *Ego cogito, ergo sum:* I think, therefore I am. That metaphysical dogma is contrary to experience. In the order of events, life precedes consciousness, just as consciousness precedes knowledge. Hence the doctrine of experience is the reverse of the Cartesian proposition, and may be formularised rather into "I live, therefore I think: I think, therefore I know." As consciousness is thus identified with existence by the Cartesian doctrine of consciousness as a cause, it is a logical conclusion from that doctrine that such a thing as unconscious existence is an absurdity, and impossible. Hence, in states of

existence like fainting, insensibility, stupor, profound sleep, and the like, it is argued that the individual is really conscious, but that, when he returns to his ordinary state, he does not recollect having been so. This question shall have a special examination; it is here referred to for the purpose of noting, that never-ceasing consciousness is also held to be necessary to personal identity—*i.e.*, to the knowledge of continuous existence as one and the same in time and space.

SECT. II.—*Consciousness as Feelings and Sensations.*

19. In practical medicine, as in the ordinary business of life, the states of consciousness termed FEELINGS are of predominant interest. The words *ease* and *disease* imply, indeed, the entire subject-matter of medical art—the body—as well as fundamental states of consciousness (p. 17). Nor are the terms limited to corporeal pain only. *Phrenalgia* (or melancholia) is as much corporeal, and as much within the scope of medicine, as *neuralgia*. Hellebore, indeed, may cure both alike, just because both may occur from similar changes in the blood and tissues.

20. Now, the fundamental doctrine of the feelings is, that they are states of existence. Yet there is as much variety in the use of the term "Feeling" by metaphysicians, as of the term *consciousness*. It has, firstly, a general application to all states of the consciousness, and is only, in fact, another term for consciousness, or the state of being conscious. Thus, Mr J. S. Mill:—"A feeling and a state of consciousness are, in the language of philosophy, equivalent expressions; everything is a feeling of which the mind is conscious." Again—"Feeling, in the proper sense of the term, is a genus, of which Sensation, Emotion, Thought, are sub-

ordinate species. Under the word *Thought* is here to be included whatever we are internally conscious of when we are said to think;—from the consciousness we have when we think of a red colour without having it before our eyes, to the most recondite thought of a philosopher or poet."* Or, more comprehensively, Mr Mill remarks, "It was of great importance, for the purpose of naming, that we should not only have names to distinguish the different classes of our feelings, but also a name equally applicable to all those classes. This purpose is answered by the concrete term *Conscious*, and the abstract of it *Consciousness*. Thus, if we are in any way sentient—that is, have any of the feelings whatsoever of a living creature—the word *Conscious* is applicable to the feeler, and *Consciousness* to the feeling,—that is to say, the words are GENERICAL MARKS, under which all the names of subordinate classes of the feelings of a sentient creature are included."†

21. *Sensation* is used in the same sense as *Feeling*. It is a quality of Sentient Beings. Accordingly, Dr Brown states—"Sensation is not the object of consciousness different from itself, but a *particular sensation* is the consciousness of the moment, as a particular hope, or fear, or grief, or resentment, or simple remembrance, may be the actual consciousness of the next moment. In short, if the mind of man and all the changes which take place in it, from the first feeling with which life commenced to the last with which it closes, could be made visible to any other thinking being, *a certain series of feelings alone*—that is to say, a certain number of successive states of the mind—would be distinguishable in it, forming, indeed, a variety of sensations, and thoughts,

* *Elements of Logic*, 3d edit. vol. i. pp. 54–5.

† *Analysis of the Phenomena of the Human Mind*, vol. i. p. 172.

and passions, as momentary *states* of the mind, but all of them existing individually, and successively to each other."* These states of consciousness, or "feelings," constitute the evidence of our existence as conscious beings. "When we speak," says Dr Brown, "of the *evidence* of *consciousness*, we mean nothing more than the evidence implied in the mere existence of our sensations, thoughts, desires, which it is utterly impossible for us to believe to be and not to be, or, in other words, impossible for us *to feel* and *not to feel*, at the same moment."† Hence the cognition of self, or self-consciousness, implies more than a feeling of existence, or feeling of pain, or the like. It implies a knowledge of existence founded on comparison and observation. Thus, Dr Brown observes, "It is on observation, therefore, or on consciousness, which is only another word for *internal observation*, that the whole of science is founded; because there can be no comparison without observation of the phenomena compared, and no discovery of agreement or disagreement without comparison."‡ The mental process by which we arrive at self-consciousness in ourselves is also that by which we arrive at a knowledge of consciousness in another. We see that, under certain conditions, we perform certain acts consecutively to, or coincidently with, certain feelings, or emotions, or sensations; when we observe other animals, under similar conditions, doing the same acts, we infer that they are in the same states of existence—that is, the same states of consciousness—as ourselves. And this is the only way in which we can arrive at a knowledge of the states of consciousness in all others than ourselves; for even human speech comes

* *Lectures on the Philosophy of the Human Mind*, vol. i. p. 245, edit. 1820.

† *Op. cit.* vol i. p. 256.

‡ *Ibid.* vol. i. p. 88.

under this general category. When, however, we attempt to apply the criterion to lower animals, we find that it is insufficient as a proof of consciousness.

22. *Sensibility* is a term which is used by the majority of continental writers to indicate that state of a part of the body which takes place, when, on the application of a stimulus, those vital actions which *seem* to indicate feeling are excited. It is also used in this sense by Whytt and other physiological writers. The same condition has been termed *physical sensation*, inasmuch as there is no consciousness of pain, or of the impression which is the stimulus to the vital actions. These are now well known as reflex acts, and are purely automatic. Other actions of this class, which are necessarily associated with feelings or sensations, are concluded by many writers to be therefore *caused* by sensation. This, however, seems to be an error in induction.

23. Feeling and sensation are terms often used synonymously, and in special applications. Thus, feeling has a special application to states of the consciousness consequent upon, or coincident with, the excitation of the *emotions* and *passions*. These, in so far as they are either pleasurable or painful states of existence, are generalised under the term "The Feelings." But feeling has also a special application to states of the consciousness induced by changes in the organ of consciousness through the sense of Touch. We feel whether a thing is hard or soft, rough or smooth; we feel our way in darkness. Feeling has also a special application to states of consciousness consequent on bodily injuries. As to these, sensation and feeling have been used synonymously, and the simple feeling of pain has been classed (but, as I think, erroneously) with the states of consciousness in which, by means of our senses, we become

cognisant of the qualities of bodies, and of an external world. Thus Mr Mill terms the various kinds of pain or titillation accompanying lacerations, cuts, bruises, friction, light touches, and the like, "sensations of disorganisation." Those feelings which accompany the varied actions of the muscles, those which are referred to the alimentary canal, and those which we have by the five senses, are all equally termed sensations by him.

24. Upon the whole, consciousness is best described as a succession of states of existence, characterised by feelings, thoughts, volitions, and the like. Sir Henry Holland seems to describe it in the fewest and simplest words as constituting the mental life of man:—"What, then, is this consciousness? Scarcely can we render the conception of it clearer by definition, or describe what is inseparable from our existence and identity of being. . . . . We have in the instrument of examination the actual thing to be examined; for we cannot better describe the mental life of man than as embodied in a succession of acts or states of consciousness, so continuous as to give and maintain the sense of personal identity."*

SECT. III.—*Consciousness as Knowledge: Cognitional Consciousness.*

25. We have seen that, fundamentally, consciousness is the knowledge of our existence; and that our feelings, or sensations, are but states of this knowledge—are to us the evidence of our existence both in time and space. The term *consciousness* has been applied more widely in the sense of knowledge to a variety of mental phenomena, and in a variety of meanings. Some of these must be examined.

* *Chapters in Mental Physiology*, 1st edit. p. 47.

26. In the *first* place, by the term Consciousness, as used by philosophers, in its strictest sense, an intuitive knowledge of *present* and conscious existence only is implied; an intuitive knowledge of both past and present existence is a form of *self*-consciousness, and known as personal identity. Self-consciousness, in the full sense of the term, comprehends an intuitive knowledge of existence, both past, present, and future. Thus Sir William Hamilton states as to consciousness simply, "Consciousness is a knowledge *solely of what is now and here present* to the mind. It is therefore only intuitive, and its objects exclusively presentative. Again, consciousness is a knowledge of *all* that is now and here present to the mind: every immediate cognition is thus an object of consciousness, and every intuitive cognition itself simply a special form of consciousness."* And so also M. Cousin: "It is not by consciousness that we feel, or will, or think, but it is by it we know that we do all this." Here consciousness is not applied to existence simply, but only to certain modes of existence.

27. *Secondly*, Consciousness is identified with intuitive cognitions, and through these with intuitive beliefs. "An act of consciousness is of the most elementary character; it is the condition of all knowledge; I cannot, therefore, define it to you; but as you are all familiar with the thing, it is easy to enable you to connect the thing with the word. I know, I desire, I feel. What is it that is common to all these? *Knowing*, and *desiring*, and *feeling* are not the same, and may be distinguished. But they all agree in one fundamental condition. Can I know without *knowing* that I *know?* Can I desire without *knowing* that I desire? Can I feel without *knowing* that

* *Supplementary Dissertation*, note B, § 1, p. 810.

I feel? This is impossible. Now, this knowing that I know, or desire, or feel, this common condition of self-knowledge, is precisely what is denominated Consciousness."* Here consciousness, or *knowledge*, is substituted for *existence*—the one fundamental condition of knowing, and desiring, and feeling; and, at the same time, for the intuitive cognition of self—that is, is made equal with self-consciousness. And in entire consistency with this view, Sir William Hamilton subsequently remarks: "We are wholly unable to conceive a being possessed of feeling and desire, and, at the same time, without a knowledge of any object upon which his affections may be employed, and without a consciousness of these affections themselves."† Now, if we extend the application of this doctrine to the earliest stages of human existence, or to the lower divisions of the animal kingdom, we cannot but see its restricted range. It is very probable that a newly-born infant feels pain without knowing that it feels as an individual, and desires without knowing what it desires—probable as a matter of fact, and probable because the cognition of self, or *me* implies the cognition of the *not-me*, or the external world,—an amount of knowledge which, if conceded for the newly born-infant, or the human fœtus *in utero* (and this is a great assumption), cannot be reasonably conceded to the members of the lowest classes of the animal kingdom, as hydras and oysters, which may possibly feel pain and enjoyment, but have probably no knowledge of self. It is to be observed, however, that this acute logician affirms on the same page, what few will deny, "that consciousness is the condition of all internal phenomena — comprises within its sphere the whole phenomena of mind." It is

* Sir W. Hamilton. *Lectures on Metaphysics*, vol. i. p. 158.

† *Ibid.* p. 188.

applicable, therefore, equally to a state of existence constituted of the simplest feeling of bodily pain, or of the simplest act of will, as of the most elaborate series of thoughts, or the strongest emotions.

28. *Thirdly*, Consciousness is identified with attention, or the special direction of the senses and the faculties to any given object or subject. This includes volition. A person walks along the street, and is passed by a friend, of whom he takes no notice; or the clock strikes loudly, and he does not hear it. He is said to be unconscious of the objects he neglects, and conscious of the thoughts that at the moment engaged his mind. So Sir William Hamilton observes: "When occupied with other matters, a person may speak to us, or the clock may strike, without our having any consciousness of the sound; but it is wholly impossible for us to remain in this state of unconsciousness intentionally and with will. We cannot determinately refuse to hear by voluntarily withholding our attention; and we can no more open our eyes, and by an act of will avert our mind from all perception of sight, than we can by an act of will cease to live. We may close our ears or shut our eyes, as we may commit suicide; but we cannot, with our organs unobstructed, wholly refuse our attention at will. It therefore appears to me the more correct doctrine to hold that there is no consciousness without attention, without concentration—but that attention is of three different degrees or kinds."* Now, it is worthy notice that this state of existence, or of necessary consciousness, termed attention, is, under certain conditions, universally acknowledged to be a vital or corporeal state. Thus Sir W. Hamilton proceeds to say of the three kinds

* *Lectures on Metaphysics*, vol. i. p. 247.

or degrees of attention, "The first [is] a mere vital and irresistible act; the second, an act determined by desire, which, though involuntary, may be resisted by our will; the third, an act determined by a deliberate volition. An act of attention—that is, an act of concentration—seems thus necessary to every exertion of consciousness, as a certain contraction of the pupil is requisite to every exercise of vision." I shall show, subsequently, that every form of attention is a state of consciousness coincident with a corresponding state of the portion of the organism involved. It is not so much an exertion of consciousness as of the organs involved in the effort; and when the individual concentrates his attention upon his own thoughts, his state is analogous to that state of existence which accompanies dreaming, or even sound sleep. In the one case the senses are not directed to external things by the waking man, he being otherwise occupied; in the other the senses are not so directed because of that corporeal condition known as sleep.

29. *Fourthly*, Consciousness is identified with memory and recollection, or the knowledge of the past, both popularly and by philosophers. Thus, when a person means to say that I do not recollect an event, he will say, It is not in my memory; I am not conscious of it; or, I am not aware that it happened.

Memory and recollection are two materially related faculties, by which past states of existence are brought into relation with the present and anticipations of the future. Sir William Hamilton distinguishes memory as the retentive or conservative faculty; recollection as the reproductive. "Memory," he says, "strictly so denominated, is the power of retaining knowledge in the mind, but out of consciousness: I say retaining knowledge in the mind, but out of consciousness; for to bring

the *retentum* out of memory into consciousness, is the function of a totally different faculty." "If we are capable of knowledge, it is not enough that we possess a faculty of acquiring, and a faculty of retaining it in the mind, but out of consciousness; we must further be endowed with a faculty of recalling it out of unconsciousness into consciousness; in short, a reproductive power. This reproductive faculty is governed by the laws which regulate the succession of our thoughts—the laws, as they are called, of mental association." "By *reproduction*, it should be observed that I strictly mean the process of recovering the absent thought from unconsciousness, and not its representation in consciousness," &c. Here we have the word "unconsciousness" used in a mode which seems to contradict the doctrine that the mind is never unconscious; for if it can be unconscious as regards all previous states of existence, why (*mutatis mutandis*) cannot it be unconscious as regards the present? Memory is, however, like attention in its nature; it is a faculty so intimately associated with the operation of the vital forces, that no man doubts its entire dependence upon corporeal states. We may doubt as to absolute unconsciousness, but there can be no doubt as to absolute loss of memory and the power of reminiscence; and it is equally certain that that loss is wholly due to morbid changes in the nervous system—*i.e.*, in the encephalon.

CHAPTER IV.

CONSCIOUSNESS AS THOUGHT AND WILL.

SECT. I.—*Successional Consciousness, or Thought.*

30. EVERY man who examines the order of his own states of consciousness is cognisant of a continuous succession of them. This succession has been termed trains of ideas; and when combined definitely, the association of ideas. When the thoughts that succeed each other have reference mainly to pre-existent thoughts—that is, to antecedent states of consciousness—the condition is termed Reminiscence; and when these succeed, in consequence of a special attempt to recal states of past consciousness into consciousness again, the process is an act of Energy —a volition—termed Recollection, or an act of memory. Sir William Hamilton, as we have seen, designates it *Reproduction*.

31. If we examine our thoughts in relation to our existence, we find, in the first place, that they are involuntary. When we are conscious, we cannot help but be conscious; when we have thought, we cannot help but think. Man can no more help thinking and feeling than he can help existing. If he would stop the current of his thoughts altogether, he must interrupt mental existence altogether. Hence it is that men so often long for a Lethe, to cease from painful thoughts; that so often drugs are taken to modify or interrupt thought; that so often the hope of utter oblivion is so sweet.

32. This identity of necessary modes of thought and of existence, in respect to the fact of necessary continuousness, as involuntary successions and co-existences of events, has had the fullest recognition by all the foremost philosophers. "So completely," says D. Stewart, "is the current of thoughts in the mind subjected to physical laws, that it has been justly observed by Lord Kames that we cannot, by an effort of our will, call up any one thought, and that the train of our ideas depends on causes which operate in a manner inexplicable by us. This observation, although it has been censured as paradoxical, is almost self-evident; for to call up any particular thought, supposes it to be already in the mind."* To the like effect Mr Mill thus remarks: "Thought succeeds thought, idea follows idea, incessantly. If our senses are awake, we are continually receiving sensations of the eye, the ear, the touch, and so forth; but not sensations alone. After sensations, ideas are perpetually excited of sensations formerly received; after those ideas, other ideas; and during the whole of our lives a series of these two states of consciousness, called sensations and ideas, is constantly going on. I see a horse; that is a sensation. Immediately I think of his master; that is an idea [conception]. The idea of his master makes me think of his office; he is a minister of state; that is another idea," &c.† Again the same writer observes, "Over the occasions of our sensations, we have an extensive power. We can command the smell of a rose, the hearing of a bell, the sight of a tree, the sensations of heat and cold, and so on. Over the occasions of our ideas, we have little or no direct power. Our ideas come and go. There is a perpetual train of them, one

* *Elements of the Philosophy of the Human Mind*, chap. v. § 3.

† *Analysis of the Human Mind*, vol. i. p. 53.

succeeding another; but we cannot will any link in that chain of ideas; each link is determined by the foregoing; and every man knows how impossible it is, by mere willing, to make such a train as he desires. Thoughts obtrude themselves without his bidding; and thoughts which he is in quest of will not arrive."* To the same effect, although in reference to the active rather than passive states of consciousness, writes Sir William Hamilton: "To prevent misunderstanding, it may be observed, that in saying the mind is active and passive, in a cognition, I do not mean to say that the mind is free to exert or not to exert the cognitive act, or even not to exert it in a determinate manner. The mind energises as it lives, and it cannot choose but live; it knows as it energises, and it cannot choose but energise. An object being duly presented, it is unable not to apprehend it, and apprehend it both in itself and in the relation in which it stands. It may evade the presentation, not the recognition of what is presented."†

Since the acquisition of knowledge and its ready application to the needs of the moment wholly depend upon the vigour of these processes, it is of the highest practical importance to determine the laws of association of ideas with especial reference to memory and recollection. Hence, from Aristotle downwards, these laws have had the most careful investigation. But the same defect has vitiated this part of philosophical inquiry as we have found to vitiate others. It has been attempted to determine how ideas are reproduced into consciousness before it has been determined how they are produced.

33. Now we have seen that the mind only energises

* *Analysis of the Human Mind*, p. 88.

† *Reid's Works*, note D, foot-note p. 859.

in relation with body; that its existence is *manifested* only under certain conditions of body; that, consequently, the succession of states of consciousness must have relation to succession of states of body. It is over these latter, therefore, that the man exercises a power, when, by means of alcohol, opium, and other drugs, he modifies the succession of his thoughts—either when he interrupts it altogether, or modifies it so as to develop new and more pleasurable trains of thought. Conversely, when thoughts arise not only unbidden, but contrary to the experience of the man, as in insanity; or when they assume a complexion of gloom or brightness to which they have no real claim, as in insane delusions, and thereby affect the judgment so as to lead on to homicide or suicide, or a thousand foolish acts,—it is inferred conclusively from the facts of daily experience, as well as from the general deductions of medical science, that the morbid states of the thoughts and will are due to changes in the body.

34. That changes in the brain affect the memory, is one of the best established facts in philosophy. No honest inquirer denies the general fact. Looking upon the acquisition of knowledge, or the exercise of the Retentive Faculty, and the recollection of knowledge when acquired, or the exercise of the Reproductive Faculty, as acts of the will (and this will not be denied by the most sceptical), we can class them with other volitions. But, the carrying a thought into action (an exercise of the Motor Faculty—an act of the will emphatically), is well known to be wholly dependent upon the integrity of the brain; if certain portions of this be modified in structure or function, the individual can no longer *perform* the acts he wills. So it is in morbid states of the memory and recollection; when certain morbid states of the brain

take place, the individual can neither acquire knowledge nor recollect what he has acquired.

35. Although metaphysicians have almost unanimously refused to expressly recognise the validity of these facts, or rather the conclusions which are deducible from them, they have not been able to neglect them in speculations as to the memory, judgment, and the like. They have found it necessary, in fact, to materialise the memory, in spite of the most opposite convictions, so that the language of metaphysicians is, in fact, in opposition to their teaching. Thus, they speak of *impressions* on the memory, of *stores*, of *traces*, of *obliterations*—all referrible to changes in the "internal objective" tissue. A curiously felicitous passage of this kind is subjoined:—"At all these times the Mind does no more than observe the ideas in her thoughts; and if she judges variously, that diversity is not owing to any act of hers, but to the different state of her imagination. She plays the spectator only, discerning the prospect before her; and whether she shall see a full or a faint evidence, or none at all, depends upon what her organs of reflection shall exhibit. This, we readily acknowledge in memory, which is one species of judgment; for what is remembering, but having the idea of a thing we know we had seen before? Everybody will allow that we remember past events according to the traces of them remaining in our memory; and when these traces sometimes happen to be altered, we remember wrong. Nor has remembrance been unfrequently compared to reading a written memorandum, which, being obliterated, gives us imperfect information or none at all, or, being erased or interlined in our absence, leads us into mistakes. And one might as aptly apply the comparison to all other kinds of knowledge, which, being nothing but the perception of what lies in

our understanding, may be called reading the characters exhibited by our mental organs; and whatever changes the inscription there, must of course produce a like alteration in our perceptions."*

36. The whole of this comparison is materialistic, in the sense in which the metaphysician uses the term—that is, treats of the judgment and memory as belonging to the man, the concrete *Ego*, and not to the abstraction, the "immaterial *Ego*." And, pursuing the train of thought, this author intimates the possibility of an entire change in a man's mental character from a change in the "seat" of his mind, indicating, but unconsciously to himself, the close dependence of morbid mental states on the vital forces. "From hence," he continues, "arises a curious question, whether, if it were possible for two men to transport their minds suddenly into one another's seats, each would not instantly lose his own ideas, and acquire those of the other. I think it cannot be doubted the exchange would be complete with respect to sensation; for the senses must convey all their notices to the present inhabitant, not being able to reach the former occupier, now removed to a distance. It seems probable that each would be able to repeat whatever the other had learned by heart, and remember occurrences happening to him; and if arts and sciences have their foundation in memory, he would slide at once into possession of the other's accomplishments. Perhaps it may be thought going too far to suppose they would adopt each other's sentiments, opinions, and consciousness; but it would be hard to demonstrate there would not be a thorough exchange in these respects too: so that the Papist might laugh at all revealed religion as being a thing ridiculous

* A. Tucker. *Light of Nature*, vol. i. chap. ii. § 17.

in itself, and the Freethinker contend tooth and nail for the Pope's infallibility; the Methodist might clearly discern at one glance the absolute impossibility of miracles, and the Rationalist hear revelations conveyed in a whisper, with an evidence greater than that of sense; the philosopher might see there is no enjoyment but in the hurry of company or a round of fashionable diversions, and the giddy girl discern the vanity of all sensual gratifications, and find herself never less alone than when alone; the saint might tremble at the dread of punishment, being conscious of villanies he never committed, and the murderer look back with joy upon a life of innocence, and feel the comforts of a conscience void of all offence."* This curious exposition of what might possibly occur, if two men were to change their "mental organs," is an epitome of what does occur in cases of insanity, and from the influence of "suggestion" or morbid attention, in mesmeric and other cases, on the mental organ and its mode of action.†

37. The associated series of states known as Thoughts are in relation with coincident series of changes in the organ of Thought, consequent upon the action of the vital forces to that end. As these will have to be considered when we discuss the physiology of memory, it is unnecessary to refer here to the laws of reproduction and

* A. Tucker. *Light of Nature*, vol. i. chap. ii. § 17.

† The above quotation is from a copy of Tucker's Works, well-thumbed about half a century ago by the readers of a public library. One or two of these have made annotations on the margin of the passage quoted; as, "*Does memory depend on a peculiar combination of matter?*" "*Ass,*" "*Blockhead,*" &c. They are all remarkably characteristic of the ignorant dogmatism which decides peremptorily on questions utterly beyond its knowledge or its powers.

association of ideas or states of consciousness laid down by metaphysicians.

38. There is a question which may be examined here, namely, the relation of successive states of consciousness to each other. It is involved in the problem, Can consciousness be occupied with more than one object at the same moment? Locke, Stewart, Brown, and others, answer the question in the negative. Sir William Hamilton takes the affirmative side, in common with Aristotle, Leibnitz, and others. It is an old subject of debate. "The modern philosophers who have agitated this question are not aware that it was one canvassed likewise in the schools of the Middle Ages. It was there expressed by the proposition, *Possitne intellectus noster plura simul intelligere?* Maintaining the negative we find St Thomas, Cajetanus, Ferranensis, Capriolus, Hervæus, Alexander Aleusis, Albertus Magnus, and Durandus; while the affirmative was asserted by Scotus, Occam, Gregorius Ariminensis, Lichetus, Marsilius, Biel, and others."* As a fact of experience, its solution would appear to be easy. "How many several objects can the mind simultaneously survey, not with vivacity, but without absolute confusion? I find," says Sir William Hamilton, "this problem stated and differently answered by different philosophers, and apparently without a knowledge of each other. By Charles Bonnet the mind is allowed to have a distinct notion of six objects at once; by Abraham Tucker the number is limited to four; while Destutt-Tracy again amplifies to six."† Sir William Hamilton thinks six; you may see six different marbles at once.

39. This does not, however, seem to meet the question. It is not how many objects you may think you see, but

* Sir W. Hamilton. *Lectures on Metaphysics*, vol. i. p. 253.

† *Op. cit.* p. 254.

how many you can be conscious of at once. The letters in a word may all be seen at once as letters of that word; are we conscious of each one as a distinct letter at one and the same instant of time? The problem is one which involves the two elements of time and succession on one hand, and the multiplicity of parts on the other. Its solution is one which would require careful experimental analysis in reference to these elements; but seeing with what rapidity the mind takes cognisance of objects, and taking into account the unity of consciousness, we may conclude that what states of consciousness seem simultaneous are either successional in great rapidity, or the whole is the object of consciousness of the moment, the parts being noted subsequently. The phenomena of attention, especially, show that the consciousness can be occupied with only one series of thoughts at a time; so that even what are otherwise the most painful impressions, are wholly unfelt when the attention is concentrated upon one object. This is a matter of daily experience; and we can conclude from the fact, that the man cannot take cognisance at the same time of states of consciousness known as conceptions, and those termed sensations. It is at least very probable that, when the mind is engaged in thought, the successive parts of which consciousness is made up—that is, occurring in time—are presented to the consciousness of the moment as one. Certainly the analysis of the thought into its elements is in fact another process altogether, and depends upon memory; it is a reproduction of the by-past state, and a representation of it to the mind. Each definite state of consciousness is, therefore, the many in the one, just as the body is the many in the one, and the *Ego* itself is the many in the one. This is the great law of all thought. In every act of perception—that is, of

recognising an object as distinct from another object—there must be the act of comparison; for one object can only be known as distinct from another, by being placed in relation therewith. Now this act of comparison involves that synthetical unity of consciousness which is termed Apperception.

40. The rapidity of succession of these acts of synthetical unity varies greatly in individuals, and when comparatively great, constitutes the quality of mind termed quickness of perception. Numerous facts prove that this quality really depends upon the rapidity of vital changes in the cerebrum, or, in other words, on constitutional conditions. It is a quality which may be acquired or confirmed by practice, and is strictly a physiological question, to be considered in a succeeding Part.

SECT. II.—*Consciousness as Will, or Volitional Consciousness.*

41. The successions of our thoughts are not always passive. In many there is a feeling of exercise of power—an Energy. These we have seen to characterise the state termed Attention, Recollection, and the like. Now these states of feeling, as to the exercise of power internally, are termed Faculties. "Faculty (*facultas*) is derived from the obsolete Latin *facul*, the more ancient form of *facilis*, from which again *facilitas* is formed. It is properly limited to active power, and therefore is abusively applied to the mere passive affections of the mind."* "Faculty is active power—capacity is passive power."† These states of consciousness are termed by Kant the Exertive or Conative faculties of the mind, and

* Sir W. Hamilton. *Lectures on Metaphysics*, vol. i. p. 177.

† *Ibid.*

are distinguished from the feelings or capacities of pleasure and pain, and the cognitive faculties. Conation is another term for willing—conations are volitions."*

42. The feeling of an exercise of power, a volition or conation, enters into all our states of consciousness. We name them differently simply because there are different ends aimed at in the various exercises of power. Now we seek to recollect a past state of consciousness—now to modify a present state—exercising ourselves with our internal processes; or we seek to modify something external to us, by an exercise of power directed through the motor apparatus of our bodies; or we carry on active efforts with both ends in view. We exercise our senses in observation of external things; we compare our observations — we draw conclusions; we thus acquire a knowledge of things, which in its turn constitutes a *motive* for our acting on external things.

43. The state of mind which precedes the feeling of the actual exercise of power is termed a *desire*. It is a general term, applicable to all our active states of consciousness; but, like volitions, desires are classed according to the object aimed at in the volition or exercise of power. Hence a variety of desires, from those directed towards the simplest requisites of existence—the corporeal desires—to the highest feelings of the soul. An entire school of physiologists have maintained that *sensation* is a cause of animal movements in the same sense that volition is; or, in other words, that a passive mental condition is also an active condition. This conclusion is not only contrary to the analytical deductions of metaphysicians, but also to corrected experience. That there are active animal movements, coincidently

* Sir W. Hamilton. *Lectures on Metaphysics*, vol. i. p. 189.

with, or consecutively to, the states of consciousness termed sensations, is quite certain; but the inference that such states are the *causes* of the movements is more than doubtful. When we endeavour to restrain this class of movements by an exercise of power, we find at once that we have the same thing to deal with as physical force, and have to make sometimes as powerful an effort to effect our purpose as if we were lifting a heavy weight. Arising out of the same class of phenomena is the oft-repeated question, whether man is free. Upon this point it is sufficient to observe here, that it is the man that acts, but man can only act according to the laws of his existence, whatever those may be. "Man," says Sir William Hamilton, "exists only as he lives; as an intelligent and sensible being he consciously lives, but this only as he consciously energises. Human existence is only a more general expression for human life; and human life only a more general expression for the sum of energies in which that life is realised, and through which it is manifested in consciousness. In a word, life is energy, and conscious energy is conscious life." * We have seen that the memory and recollection, and therewith the judgment; the attention, and therewith volition; the feelings, and therewith the desires—nay, consciousness itself,—all depend upon the operation of certain forces within us. If, therefore, a man would be free to choose to be in this state or the other, to do this thing or the other, he must be able to direct and control the internal or vital forces, just as he directs and controls the physical or external forces. This, it is clear, cannot be attained without a knowledge of those forces—or, in other words, of their relations to his varying states of consciousness;

* *Lectures on Metaphysics*, vol. ii. p. 435.

for, without that knowledge, he cannot modify those vital conditions upon which the successional states of consciousness directly depend. Perfect freedom is therefore compatible in man only with perfect knowledge of his own nature.

44. Now, men are in some degree able to regulate the succession of their thoughts, desires, volitions. All the corporeal appetites, the "lusts of the flesh," arise involuntarily and spontaneously. The man who is ignorant of their true nature is "led away captive" by them; the man with knowledge of them is often (not always) able to restrain them. A volition restrains a conation; but knowledge implies memory and recollection, and all the operations of the vital processes connected therewith. Hence, freedom of the will is necessarily coincident with healthy vital action. We are thus led to a knowledge of the nature of one of the most terrible disorders of human nature, namely, mental derangement, which is nothing more than a loss of freedom of the will, consequent upon morbid states of the organ of thought and will. And we can also understand how, in arrested development of that organ as in idiocy, or in imperfect development as amongst ignorant and savage men, the freedom of the will cannot exist, but the individual must necessarily and inevitably be the slave of any dominant *evil* propensities.

DIVISION III.

ONTOLOGY.

CHAPTER V.

UNCONSCIOUS EXISTENCE.

The relations of Consciousness to Existence have been deduced both from the side of experience and of speculation. We will examine the conclusions attained by both methods. We shall then be able to pass more easily to the doctrines of the next part—namely, those of a scientific and philosophical teleology, or mental dynamics.

45. It is remarkable how limited is the corporeal sphere of consciousness. If we except one class of vital phenomena, man is wholly unconscious of all those purely vital operations going on within him according to a plan, known as the processes of vegetative life. That class of exceptions is to be found in the vital processes of the cerebro-spinal *ganglia*, in which the *results*, and *the results* alone, of those processes, and not the processes themselves, are revealed to the consciousness. He is not conscious of any of the forces at work or produced within his organism, except when his muscles contract to perform his will. Of the chemical processes, as such, incessantly going on in every blood-corpuscle, cell, granule, fibril, he is wholly ignorant. How he grows, how his organs are formed in adaptation to the various

wants of the organism, and in fulfilment of the plan of his being, is profoundly hid from his knowledge. Nor is he more acquainted with the mode in which the healthy actions of the various tissues and organs of his body are maintained,—how waste is repaired, how disorder is obviated when it arises, how new and disturbing external agencies are met by new adaptations of organs already existing, or by the formation of new and suitable structures. His beginning is even a greater mystery to him than his destiny, for instinct and revelation alike teach him to hope confidently that he will live again in another world; but whence and how began that immortal life is not revealed, either by Divine or human wisdom, except that it is from and in God.

46. That which may be thus stated of the vital processes going on within the body of man, is true also of the organs subservient to these processes—his brain, and other viscera. He feels the results of their functional activity as registered in the cerebro-spinal ganglia, or some of them—those results corresponding to the multitudinous changes in his consciousness known as sensations, passions, thoughts, volitions, will; but independently of observation of the external mechanism, and of anatomical research, he is wholly ignorant that he has a brain, or nerves, or heart, or stomach, or lungs, or eliminating organs, and *à fortiori* of the working or functions of those organs.

47. When, therefore, the most brilliant intellects of all times have speculated independently of scientific research on these points, the result has been only to demonstrate more clearly man's innate ignorance of his constitution. The functions of the heart were unknown for thousands of years; indeed, they are of comparatively recent discovery, and at this moment are known to com-

paratively very few of mankind. The theories as to the seat of feeling, and the passions, and thought, have been most various and contradictory. By one theory of great antiquity it was fixed in the heart, and this dogma has impressed itself on the entire language of Europe; by another in the liver; by another in the diaphragm; by others in the brain, or in particular portions thereof; but by the great majority of mankind it is believed that inasmuch as there is no distinct consciousness of any organ, thought goes on independently of any organ whatever.

48. But man is not always thus conscious—*i.e.*, has knowledge of his existence. Although he knows that he exists as a dual being in unity (that is, as a body-and-soul individual) on the testimony of consciousness, or of the intuitive feeling and knowledge he has of his existence, yet he knows also, on the testimony of daily experience and common sense, that consciousness is not a necessary state of existence of the soul, any more than it is of the body. In other words, he finds by experience that consciousness, in its varying states, is often dependent upon appropriate states of the body; while, by reason, he concludes that the soul exists although there be no consciousness—that is, it exists *per se*, and independently of the body. If the feeling or knowledge of mental existence were a necessary condition of the actual existence, every time the man became unconscious—that is, ceased to feel or know—the soul would cease to exist, which is absurd. Hence the soul exists unconsciously to the man, as well as consciously. No general fact is so well established by the experience of mankind, or so universally accepted as a guide in the affairs of life, as that of unconscious mental life and action. The law founds upon it the doctrine of irresponsibility; the nightly recurring state of repose is most perfect when the consciousness is most

completely abolished; the surgeon induces that state artificially when he would exercise his art without the infliction of suffering; the state of profound slumber is the result of various morbid states; and even death itself is looked upon as but a falling asleep. The life of the soul continues, although, with the repose, or injury, or falling to pieces of the organisation, that mere terrestrial phenomena termed Consciousness ceases. All these are familiar facts and conclusions, and are rightly appreciated in the practical conduct of the affairs of life.

49. But when the general fact is transformed into a general proposition, and made a deductive principle of philosophy, an error in the use of words arises, which would be remarkable, if it were not one which is common to all the terms of philosophy. The soul being so continually identified with that mode or state of its existence termed Consciousness, the two words have come to be used synonymously; and thus effect has been substituted for cause, consequent for antecedent, a state for a thing. But Consciousness and Soul are clearly not synonymous. On the contrary, consciousness is nothing more than a generic term, by which we signify various *mental states of existence*, to which certain changes in the body are necessary antecedents; inasmuch as, unless those changes take place, the modes of consciousness do not follow. This substitution of one meaning for another in the use of the same word, is a common source of error in metaphysics. "Perception," "sensation," and other words, indicative of modes of consciousness or states of existence of the soul, are constantly used in the same double sense, and hence errors constantly arise, and interminable discussions as to words.

50. No errors in philosophy more fatal, or discussions more interminable, have arisen than from this synony-

mous use of the ideas *consciousness* and *soul*. "The general problem," remarks Sir William Hamilton, "in regard to the ceaseless activity of the mind, has been one agitated from very ancient times. . . . Plato and the Platonists were unanimous in maintaining the continual energy of intellect. . . . The Aristotelians, in general, were opposed to the Platonic doctrine. This doctrine was adopted by Cicero and St Augustine—'Nunquam animus,' says the former, 'agitatione et motu vacuus esse potest.' 'Ad quid menti,' says the latter, 'præceptum est, ut se ipsum cognoscat, nisi ut semper vivat, et semper sit in actu.' The question, however, obtained its principal importance in the philosophy of Descartes. That philosopher made the essence, the very existence, of the soul to consist in actual thought, under which he included even the desires and feelings; and *thought*, he defined, all of which we are conscious. The assertion, therefore, of Descartes, that the mind always thinks, is, in his employment of language, tantamount to the assertion that the mind is always conscious."* This doctrine is practically the identification of Knowing and Being; for, on consideration, it will be seen, that the question, as here put, refers to one element of the man only; it is not whether the man himself—the Dual in unity—is conscious, or his *body*, but whether his *mind*, considered as apart from his body, has ideas and is conscious. The question, so put, could not be a subject of experimental investigation; for never was such a thing known to a philosopher as a human mind or soul thinking and acting apart from the body. It has been demonstrated, indeed, by Professor Ferrier, in the demonstration of his *ninth* proposition, to be an impossible

* *Lectures on Metaphysics*, vol. i. pp. 312–13.

thing. "The *Ego*, or self, or mind, *per se*, is absolutely unknowable. . . . It can know itself only in some particular state, or in union with some *Non-Ego;* that is, with some element contradistinguished from itself." * And again: "To lay down the dualism of subject and object as complete and absolute (that is, as an out-and-out duality, which is not also a unity), which psychology not unfrequently does, is to extinguish every glimmering of the scientific reason; for this implies that the dualism is laid down in cognition as complete and absolute, which it can only be when intelligence acts in opposition to its own necessary and insuperable laws."† We cannot, in fact, conceive how mind could *act* independently of matter, although we can conceive it to *exist* independently of matter. But the conceivable in thought, and the conceivable in fact or act, are wholly different things. Thus the geometrician defines a point to be that which has neither parts nor dimensions. Can we, however, by any effort, realise a point—that is, an actual thing without parts or dimensions? The nearest conception of some would certainly be the idea they had formed of soul. Then as to causation, which is involved in our conception of Mind, we can conceive a cause in the abstract, but can we realise it without at the same time conceiving the thing caused—the effect? This is a matter of experience. I must say that I cannot. How can we comprehend Mind as a cause of motion until we know that motion results from its operation? or how can we comprehend it as manifested, before any manifestations of mind appear? All abstract truths end thus in the inconceivable—just as all conceivable time ends in infinite time, all space in infinite space, and the like.

51. Now, we *can* conceive mind to be existent and

* *Institutes of Metaphysic*, p. 235. † *Ibid*, p. 112.

latent,—that is, if manifested in a past time, as not manifested *now*—or if manifested now, as not to be manifested at a future time. In this way we arrive at the conception of the latent existence of the soul after death—that is, as not manifested *for a time* until the man lives again; or, in other words, until the mind is manifested in another body. And this process is the more easy, because we already apply it to the comprehension of those powers or forces of matter, that, like mind, are known only by their effects. We thus speak of *latent* heat; that is, heat not manifested by changes in matter, or in our own bodies. The so-called electric and magnetic fluids may in like manner be latent; that is to say, only manifested when matter undergoes a change cognisable by us. It is, indeed, on these relations of the "Imponderables" to matter, that the doctrine of a correlation of forces is founded. As we shall speedily see, what we call light, heat, magnetism, electricity, chemical affinity, &c., are the manifestations of one and the same primary force acting differently under varying conditions, but which are only possible in and through matter.

52. Applying these illustrations to mind in its relations to matter, we clearly see that the generalisation which distinguishes between mind and matter, is as well-founded as that which distinguishes between matter and the forces of matter; but it is equally true that we can no more realise mind as acting apart from matter, than we can realise the force of gravity or of chemical affinity as acting apart from matter. And this is one of the great empirical laws derived from human experience. The term *individual* indicates the one indivisible being constituted of both matter and mind. No man of common sense believes that his mind really acts in the ordinary concerns of life, *does* anything in the world apart from

his body. So also as to the laws of society. In the entire decalogue, nothing else is referred to but the man. No human laws give human rights to the dead; they are no longer men, but "souls" only, and cease therefore to be members of human society. It is quite remarkable, indeed, how often the common sense and experience of men triumph over man's most cherished and deep-rooted superstitions. Of the great majority in the United Kingdom who believe materialistically in ghosts, how few act up to their belief!

53. It is not otherwise with philosophy. It also abandons its dogma of independent mental action, and acts on experience. The man, in philosophy, is the concrete human *Ego*, *i. e.* the reality; while the "immaterial *Ego*" is the abstraction. "Our nervous organism," Sir William Hamilton observes, "(the rest of our body may be fairly shut out of account,) in contrast to all exterior to itself, appertains to the concrete human *Ego*, and in this respect is *subjective internal;* whereas, in contrast to the abstract immaterial *Ego*, the pure mind, it belongs to the *Non-Ego*, and in this respect is *objective external.*"* Or, take the following striking exposition, by Sir William Hamilton, of the relations of mind to body: "It may appear not a paradox merely, but a contradiction, to say that the organism is at once within and without the mind; is at once subjective and objective; is at once *Ego* and *Non-Ego*. But so it is; and so we must admit it to be, unless, on the one hand, as materialists, we identify mind with matter; or, on the other, as idealists, we identify matter with mind. The organism, as animated, is sentient; is necessarily ours, and its affections are only felt as affections of the individual *Ego*. In this

* *Reid's Works—Supp. Dissertations*, note D, § 2, p. 858, foot-note.

respect, and to this extent our organs are not external to ourselves."*

54. Philosophy thus joins with the common sense of mankind in affirming that the man is not mind alone nor matter alone. Hence we find that those philosophers who oppose the doctrine of unconscious, *i. e.* latent, states of mental existence, equally with those who advocate it, advance proofs or objections founded on the premiss that the soul in action is not separate from the body—that is, is a dualism in unity. Thus Locke, who opposed the doctrine, draws his arguments entirely from his experience of his corporeal states, just as Sir William Hamilton, who supported it, attempts to establish it by experimental research on himself during a particular corporeal state. And Locke's argument is therefore perfectly well founded. "We know, certainly," he says, "by experience, that we sometimes think, and thence draw this infallible consequence, that there is something in us that has a power to think; but whether that substance perpetually thinks or no, we can be no further assured than [the same] experience informs us." The state of existence usually selected as the battle-ground is that of sleep. So Locke says: "Wake a man out of a sound sleep, and ask him what he was at that moment thinking on. If he himself be conscious of nothing he then thought on, he must be a notable diviner of thoughts that can assure him that he was thinking: may he not, with more reason, assure him that he was not asleep?"† Cudworth in like manner appeals to experience, in opposition to the Cartesians: "Those philosophers themselves, who make the essence of the soul to consist in cogitation; and

* *Reid's Works—Supp. Dissertations*, note D*, p. 880, foot-note.

† *Essay on the Human Understanding*, book ii. chap. 1, §§ 9, 10–14, *sqq.*

again, the essence of cogitation in clear and express consciousness, cannot render it any way probable that the souls of men in all profound sleep, lethargies, and apoplexies, as also of embryos in the womb, from their very first arrival thither, are never so much as one moment without expressly conscious cogitations, which, if they were, according to the principles of their philosophy, they must, *ipso facto*, cease to have any being," &c. Again, "It is certain that our human souls themselves are not always conscious of whatever they have in them; for even the sleeping geometrician hath, at that time, all his geometrical theorems and knowledge some way in him; as also the sleeping musician, all his musical skill and songs; and therefore why may it not be possible for the soul to have likewise some actual energy in it which it is not expressly conscious of? We have all experience of our doing many animal actions non-attendingly, which we reflect upon afterwards." Again, he shows that the soul loses its sense of personal identity.—"There is also another more interior kind of plastic power in the soul (if we may so call it), whereby it is formative of its own cogitations, which itself is not always conscious of; as when, in sleep or dreams, it frames interlocutory discourses betwixt itself and other persons, in a long series, with coherent sense and apt connections, in which oftentimes it seems to be surprised with unexpected answers and repartees, though itself were all the while the poet and inventer of the whole fable."*

In the middle of the last century, Tucker controverted the doctrine as applied to personal identity. He remarks: "There seems to be the same objection against Mr Locke's doctrine of consciousness constituting identity.

* *The True Intellectual System of the Universe*, book i. chap. iii. § xxxvi. par. 17.

It would be presumption in me to contradict a man of his clear and steady judgment—therefore shall suppose I have somehow or other misunderstood him; but, to the best of my apprehension, he seems to have placed our existence in a quality, rather than a substance; for by the term *consciousness* I cannot understand a Being, but only a power or property of some Being; nor do I apprehend a man loses his existence or personality every time he loses his consciousness by falling asleep. Could Mr Locke himself imagine that his person was annihilated every night when he went to sleep, and recreated again when he awoke in the morning? The most that I can allow to consciousness, unless I grossly mistake the word, is, that it should be, in most cases, the evidence to us of our identity; for scenes that we remember convince us of our being the very persons present at them."*

55. Sir William Hamilton advances, on the opposite side, experimental inquiries, as well as the usual argument, that we are conscious in sound sleep, but do not recollect having been conscious. This latter he supports by the phenomena of somnambulism, in which it is very certain that there are two parallel but wholly distinct series of conscious states, and in which the individual has, as it were, two mental lives, or, as some might say, two souls; so that, when existent in the one state, he is utterly unconscious of what he thought, or felt, or did in the other. But in these instances (which are by no means rare) the one state is clearly dependent upon bodily conditions; for when those conditions again occur, then there *is* recollection of the thoughts and actions done or felt during a previous state of the same bodily conditions. Further, although the individual himself be unconscious of his somnambulistic acts, those about him

* Tucker. *Light of Nature*, vol. iii. p. 76, 2d edit.

have witnessed them, whereas, in an absolutely sound sleep, there is no evidence whatever to the bystanders of mental activity in the sleeper. The man lies perfectly still, only breathing gently and regularly. He is said to be living, but unconscious. Sir William Hamilton made experiments upon himself, with the view of settling the question practically. He caused himself to be suddenly wakened from sleep at different seasons of the night, and found that he was always able to observe that he was in the middle of a dream, although often very slight. It is to be remembered, however, that some men, from a special constitution of their nervous system, never are in absolutely deep sleep; and this, as he had an attack of hemiplegia, might be the case with Sir William Hamilton. If, however, it be granted that the fact were otherwise, still the experiments prove nothing; for, from the known rapidity of mental activity, the period which would necessarily elapse, however short, between the profound sleep and the awakening to complete consciousness, would necessarily be occupied by a dreamy state. To all this it may be added, that Sir William has himself settled the question by his doctrine of "mental latencies." Further, Sir William Hamilton expressly excludes morbid and physiological states generally from his inquiry, without any satisfactory reason. Now, there can be no reasonable doubt that there are states of stupor in which the encephalic structures—the acknowledged organs of thought and conscious mental activity—are so compressed, or so supplied with poisonous blood, that their function is wholly suspended, its continuance being in fact proved to be impossible. Again, there are fœtuses without brains which live and move—*i.e.*, have Being—in which all cognitive activity is impossible, inasmuch as the encephalon is in them wholly deficient.

56. It must be remembered, also, that consciousness, in the largest sense, varies in degree according as the corporeal conditions vary. This is seen in the majority of cases of anæsthesia, whether caused by chloroform or alcohol, in which there is a gradual and progressive abolition of consciousness. First the external senses, beginning with the touch, or common sensation, are benumbed; then the cerebral nerves, and faculties of perception; then abolition of consciousness as to thought and feeling succeeds,—the respiratory ganglia and apparatus alone acting; and finally, in fatal cases, abolition of *their* functional activity, and therewith death. This order of events is seen in surgical cases when chloroform is administered, and also when other poisons operate upon the nervous system and nerve-centres. In fatal alcoholic intoxication, and in the changes produced by opium, we see the same gradual advance of anæsthesia from the hemispheres, the organ of thought, to the respiratory ganglia, the centre of life. Claude Bernard found that when sensibility disappeared in an animal from the action of any poison whatever, the fifth pair, which supplies nerves of sensation to the head and face, was the last of the cutaneous nerves to become insensible.*

57. Closely related to the question of unconscious existence is that of "indifferent" sensations. Are there states of consciousness in which we have no conjoint affection of the agreeable or disagreeable? Reid teaches the doctrine of indifferent sensations. It is a point not easy to settle absolutely; but, upon the whole, the opposite doctrine appears the more probable—namely, that there is such an affection of the consciousness as is termed feeling in every act or state of it, although

* *Leçons sur la Physiol. et Pathol. du Système Nerveux*, (1858), tom. ii. p. 86.

it may be, and often is, very slight. The phrase "indifferent sensation" seems, in fact, to imply a contradiction. In ordinary states of consciousness, no one can doubt that there is a feeling of pleasure or pain. It is only as to the higher abstractions of the intellect that any doubt can arise. Now, in these, is *desire* ever absent? If not, then they can never be indifferent, unless desire itself be a state of indifference, which is a contradiction in terms. Sir William Hamilton clearly expresses the facts upon this point. "Cognition and feeling are always co-existent. The purest act of knowledge is always coloured by some feeling of pleasure or pain; for no energy is absolutely indifferent, and the grossest feeling exists only as it is known in consciousness. This being the case of cognition and feeling in general, the same is true of perception and sensation in particular. Perception proper is the consciousness, through the senses, of the qualities of an object known as different from self. Sensation proper is the consciousness of the subjective affection of pleasure or pain which accompanies that act of knowledge. Perception is thus the objective element in the complex state—the element of cognition; sensation is thus the subjective element—the element of feeling."*

58. Upon the whole, ordinary language expresses the varying states of our existence as regards the consciousness. They are classed, in fact, in the terms known as verbs, which are immediately expressive of the states of the *Ego*, I, or individual man. I *exist*, implies life without consciousness, *i.e.* suspended mental animation; I *feel*, implies consciousness simply; I *think*, implies self-consciousness; I *do*, implies the state of consciousness known as will—the man not passive but active, not suffering but acting; and hence it is that the word *logos*—the term

* *Lectures on Metaphysics*, vol. ii. p. 99

for mind in its highest development—is translated *verbum, the verb*, or emphatically "the Word," the old English term for the Being or Becoming. It is a remarkable circumstance, that this doctrine of unity in duality is distinctly expressed in one of the great creeds of Christendom—the widest spread, in truth, of any—and settled only after discussions which shook the whole fabric of society throughout the civilised world. And more, it is expressed as illustrative of the greatest mystery of the Christian faith. According to that creed—the creed of St Athanasius—"as the reasonable soul and flesh is one man, so God and man is one Christ—not by confusion of substance, but by unity of person."

The true source of all these discussions as to whether consciousness is continuous or not, is in the fundamental doctrine which holds Mind apart from Life (p. 62). When we reverse the doctrine, and include life under mind, as the common cause of both conscious and unconscious existence, we view consciousness and unconsciousness in the same light as they are placed by the experience of mankind—namely, as modes of existence which are determined by the varying phenomena of vital action. Such being the general law, the proper inquiry is, what vital phenomena correspond to conscious states of existence, what to unconscious. There are the phenomena of conscious and unconscious cerebral action.

CHAPTER VI.

LATENT CONSCIOUSNESS.

59. There is a doctrine of psychology closely connected with the doctrines of unconscious cerebral action, which I was the first to develop, more than twenty years ago, of vast importance to a practical science of mind. Sir William Hamilton, who alone of British psychologists has fully developed the theory of latent states of mental activity, "or mental latency," distinguishes three degrees of the condition. The first is to be seen in acquired knowledge. "I know a science or language, not merely while I make a temporary use of it, but inasmuch as I can apply it when and how I will. Thus the infinitely greater part of our spiritual treasures lies always beyond the sphere of consciousness, hid in the obscure recesses of the mind. This is the first degree of latency."* This is the condition referred to by Cudworth as an unconscious state (54). It is identical with memory, or the result of the "conservative faculty," and which has been already referred to as a state of unconsciousness (29). It is identical also with potential existence, as opposed to actual existence. In physiology it corresponds to the primordial stage of life —that of the primordial cell and the immediate products of development,—a stage in which the energies of the whole future life are "latent," or "potentially" present.

* *Lectures on Metaphysics*, vol. i. p. 339.

Sir William Hamilton clearly distinguishes these two forms of existence, and illustrates them by this first degree of latency. "Potential existence means merely that the thing *may be* at some time; actual existence, that it now *is*. Thus the mathematician, when asleep or playing at cards, does not exercise his skill; his geometrical knowledge is all latent, but he is still a mathematician—potentially:—

> 'Ut quamvis tacet Hermogenes, cantor tamen atque
> Optimus est modulator;—ut Alfenus vafer, omni
> Abjecto instrumento artis, clausaque taberna
> Sutor erit.' *

'Hermogenes,' says Horace, 'was a singer, even when silent.' How? a singer not *in actu*, but *in posse*. So Alfenus was a cobbler *potential;* whereas, when busy in his booth, he was a cobbler *actual*. In like manner my sense of sight potentially exists, though my eyelids are closed; but when I open them, it exists actually."† This, it must be admitted, is the true mode of setting forth the theory of unconsciousness. When the man is unconscious and the organ healthy, the mind is *potentially* active, and this in every stage of his existence.

60. "The second degree of latency exists," Sir William Hamilton states, "when the mind contains certain systems of knowledge, or certain habits of action, which it is wholly unconscious of possessing in its ordinary state, but which are revealed to consciousness in certain extraordinary exaltations of its powers. The evidence on this point shows that the mind frequently contains whole systems of knowledge, which, though in our normal state they have faded into oblivion, may, in certain abnormal states,

* Horace, *Sat.* I. iii. 129.

† *Lectures on Metaphysics*, vol. i. p. 179.

as madness, febrile delirium, somnambulism, catalepsy, &c., flash out into luminous consciousness, and even throw into the shade of unconsciousness those other systems by which they had for a long period been eclipsed and extinguished. For example, there are cases in which the extinct memory of whole languages was suddenly restored, and, what is even more remarkable, in which the faculty was exhibited of accurately repeating, in known or unknown tongues, passages which were never within the grasp of conscious memory in the normal state. This degree, this phenomena of latency, is one of the most marvellous in the whole compass of philosophy."* Sir William Hamilton then adduces cases illustrative of the statement, most of which are familiar to the students of insanity, hysterical delirium, somnambulism, mesmeric clairvoyance, and so forth. This degree of latency is psychologically only another form of reproduction from memory, excited by diseased activity of the organ of thought. We shall see subsequently that such reproductions are not limited to the latencies acquired during the individual's life, but that they extend to hereditary transmissions of habits, capacities, &c., deduced from the parents—one or both.

61. The third class or degree of latent modifications are included in the question stated by Sir William Hamilton, whether in the ordinary processes of mental life, there are "mental modifications — *i.e.*, mental activities and passivities, of which we are unconscious, but which manifest their existence by effects of which we are conscious." Now, Sir William Hamilton's answer is, "I am not only strongly inclined to the affirmative,—nay, I do not hesitate to maintain, that what we are conscious

* *Lectures on Metaphysics*, vol. i. pp. 339–40.

of is constructed out of what we are not conscious of,—that our whole knowledge, in fact, is made up of the unknown and incognisable."* These, as we have seen, are the vital changes, the results of which are coincident with conscious states. This remarkable metaphysical doctrine is supported by its eminent propounder with all that logical acumen for which he was so distinguished. In answer to the objection, How can we know that of which we are unconscious, seeing that consciousness is the condition of knowledge? "it is enough to allege," he remarks, "that there are many things which we neither know nor can know in themselves—that is, in their direct and immediate relation to our faculties of knowledge—but which manifest their existence indirectly through the medium of their effects. This is the case with the mental modifications in question: they are not in themselves revealed to consciousness; but as certain facts of consciousness necessarily suppose them to exist, and to exert an influence in the mental processes, we are thus constrained to admit as modifications of mind what are not in themselves phenomena of consciousness."

62. Then, in reply to the objection which asks, How can knowledge come out of ignorance—consciousness out of unconsciousness—the known out of the unknown? Sir William Hamilton brings forward special evidence to the effect that such is constantly occurring under ordinary circumstances. First, it is seen in all acts of Perception. There is a *minimum* impression on the sense engaged in the act, beyond which the object becomes imperceptible, yet that minimum is composed of parts. Consequently the parts impress the consciousness, yet they are unperceived. "Vision is the result of the rays

* *Op. cit.* vol. i. p. 347.

of light, reflected from the surface of objects to the eye; a greater number of rays is reflected from a larger surface; if the superficial extent of an object, and, consequently, the number of the rays which it reflects, be diminished beyond a certain limit, the object becomes invisible; and the *minimum visibile* is the smallest expanse which can be seen,—which can consciously affect us,—which we can be conscious of seeing. This being understood, it is plain that, if we divide this *minimum visibile* into two parts, neither half can, by itself, be an object of vision or visual consciousness. They are, severally and apart, to consciousness as zero. But it is evident that each half must by itself have produced in us a certain modification, real though unperceived; for as the perceived whole is nothing but the union of the unperceived halves, so the perception—the perceived affection of which we are conscious—is only the sum of two modifications, each of which severally eludes our consciousness."

63. Sir William Hamilton multiplies instances of a less abstract character. Thus, the leaves of a forest are not cognisable at a distance, only an expanse of green; yet each leaf must have entered into the entire impression; the murmur of the sea heard at a distance is made up of parts—is the complement of the noise of many waves—just as the noise of each wave is the complement of the noise caused by many particles of water dashing upon the shore. It is an *anerithmon gelasma.* His most interesting illustration, however, is taken from the mental process termed Association of Ideas, in which "one thought suggests another in conformity to certain determinate laws—laws to which the successions of our whole mental states are subjected." "It sometimes happens," Sir William Hamilton continues, "that we find one thought rising immediately after another in

consciousness, but whose consecution we can reduce to no law of association. Now in these cases we can generally discover, by an attentive observation, that these two thoughts, though not themselves associated, are each associated with certain other thoughts; so that the whole consecution would have been regular, had these intermediate thoughts come into consciousness between the two which are immediately associated." The intermediate thoughts are latent modifications of consciousness. If a number of billiard balls be placed in a straight row touching each other, and the first at one end be struck, it is only the last or terminal one of the row which moves from its place; all the others are motionless, and serve only to transmit the force delivered to the first. "Something like this," Sir William Hamilton observes, "seems often to occur in the train of thought. One idea mediately suggests another into consciousness—the suggestion passing through one or more ideas which do not themselves rise into consciousness."

64. This phenomenon was noticed and explained by Professor D. Stewart, on the same grounds from which it is argued that the mind is always conscious; for he maintained that the connecting links are really ideas, of which the consciousness is so transient that they are immediately forgotten. Sir William Hamilton very successfully meets this view, and asserts the unconscious character of the connecting links; but he at the same time does not explain how there can be *ideas* which do not rise into consciousness—for consciousness seems absolutely necessary to an idea—unless the term be qualified by the term *material;* in which case a material idea corresponds to a series of vital changes in the organ of thought. As the whole argument is a substantial assertion of the doctrine of unconscious existence, and highly illustrative

of the difficulties which beset the ordinary methods of metaphysical inquiry, I subjoin it. We have seen that Mr Stewart says there is momentary consciousness of the intermediate links in the chain of ideas, but no memory. Sir William Hamilton replies: "In the *first* place, to assume the existence of acts of consciousness, of which there is no memory beyond the moment of existence, is at least as inconceivable an hypothesis as the other. But, in the *second* place, it violates the whole analogy of consciousness, which the other does not. Consciousness supposes memory; and we are only conscious as we are able to connect and contrast one instance of our intellectual existence with another. Whereas, to suppose the existence and efficiency of modifications beyond consciousness, is not at variance with its conditions; for consciousness, though it assures us of the reality of what is within its sphere, says nothing against the reality of what is without. In the *third* place, it is demonstrated that, in perception, there are modifications, efficient, though severally imperceptible; why, therefore, in the other faculties, should there not likewise be modifications, efficient, though unapparent? In the *fourth* place, there must be some reason for the assumed fact that there are perceptions or ideas of which we are conscious, but of which there is no memory. Now, the only reason that can possibly be assigned is, that the consciousness was too faint to afford the condition of memory. But of consciousness, however faint, there must be some memory, however short. But this is at variance with the phenomena; for the ideas A and C may precede and follow each other without any perceptible interval, and without any, the feeblest memory of B. If there be no memory, there could have been no consciousness; and therefore Mr Stewart's hypothesis, if strictly interrogated,

must even at last take refuge in our doctrine; for it can easily be shown that the degree of memory is directly in proportion to the degree of consciousness, and, consequently, that an absolute negation of memory is an absolute negation of consciousness."*

65. Sir William Hamilton adduces another class of phenomena, to which his theory of mental latencies is applicable—namely, the operations resulting from our acquired dexterities and habits. As I shall refer to these when considering instinctive consciousness, I shall not notice this part of the argument here. I would rather call attention to his history of the doctrine. Leibnitz seems to have been the first who detected and attempted to explain this class of "mental latencies." "To this great philosopher," remarks Sir William Hamilton, "belongs the honour of having originated this opinion, and of having supplied some of the strongest arguments in its support. He was, however, unfortunate in the terms which he employed to propound the doctrine. The latent modifications—the unconscious activities of mind—he denominated *obscure ideas*, *obscure representations*, *perceptions without apperception or consciousness*, *insensible perceptions*, &c. In this he violated the universal usage of language. For perception, and idea, and representation, all properly involve the notion of consciousness—it being, in fact, contradictory to speak of a representation not really represented; a perception not really perceived; an actual idea of whose presence we are not aware."† Sir William Hamilton mentions Lord Kames (Home) and Abraham Tucker as exceptions to the statement, that "to British psychologists the opinion would hardly seem to have been known. By none, certainly, is it

* *Op. citato*, pp. 353–55. † *Ibid.* p. 362.

seriously considered." The passage mentioned by Sir William Hamilton, in which Tucker refers to the phenomena, is interesting, inasmuch as it presents the most familiar illustration of the process of unconscious cerebral activity, and points at "the internal mechanism." It is to be met with in his discussion of "trains of ideas." "But though the Mind, by her notice, begins the formation of a train, there is something in our internal mechanism that strengthens and completes the concatenation. It has been generally remarked by schoolboys, that after having laboured the whole evening before a repetition, to get their lesson by heart, but to very little purpose, when they rise in the morning they shall have it current at their tongue's end, without any further trouble. Nor is it unusual with persons of riper years, upon being asked for a determination, which they cannot form without a number of things to be previously considered, to desire time to sleep upon it; because, with all their care to digest their materials, they cannot do it completely; but after a night's rest, or some recreation, or the mind being turned for awhile into a different course of thinking, *she finds they have ranged themselves anew during her absence*, and in such manner as exhibits almost at one view all their mutual relations, dependences, and consequences, *which shows that our organs do not stand idle the moment we cease to employ them, but continue the motions we put them into* after they have gone out of sight, thereby working themselves to a glibness and smoothness, and falling into a more regular and orderly posture than we could have placed them with all our skill and industry."*

* *The Light of Nature Pursued.* By Abraham Tucker, Esq., 2d edit. (1805), chap. x. § 4, vol. i. p. 248. This work occupied its author from 1750 to his death in 1774.

66. Nothing can more clearly show the unpractical character of speculative metaphysics than the circumstance, that this important doctrine of mental philosophy should have attracted no attention in this country, until it was revived by Sir William Hamilton in his lectures, and applied by the author, twenty years ago, to an explanation of the functions of the brain,—without any knowledge, however, on his part, of Sir William Hamilton's teachings. This neglect Sir William Hamilton attributes to the obscure phrases by which Leibnitz first propounded it. "The close affinity of mental modifications with perceptions, ideas, representations, and the consequent commutation of these terms, have been undoubtedly the reasons why the Leibnitzian doctrine was not more generally adopted, and why, in France and in Britain, succeeding philosophers have almost admitted as a self-evident truth, that there can be no modification of mind devoid of consciousness. As to any refutation of the Leibnitzian doctrine, I know of none. Condillac is indeed the only psychologist who can be said to have formally proposed the question. He, like Mr Stewart, attempts to explain why it can be supposed that the mind has modifications of which we are not conscious, by asserting that we are in truth conscious of the modification, but that it is immediately forgotten.* In Germany, the doctrine of Leibnitz was almost universally adopted. I am not aware of a philosopher of the least note by whom it has been rejected. In France, it has, I see, lately been broached by M. de Cardaillac as a theory of his own; and this, his originality, is marvellously admitted by authors like M. Damiron, whom we might reasonably expect to have been better informed."†

* *Origine des Connoisances Humaines*, sect. ii. c. i. §§ 4–13.

† *Lectures on Metaphysics*, vol. i. p. 362.

In a note to this passage, the Editors of the *Lectures* remark: "In the *second* edition of Damiron's *Psychologie* (vol. ii. p. 188), Leibnitz is expressly cited. In the *first* edition, however, though the doctrine of latency is stated (tom. ii. p. 190), there is no reference to Leibnitz." The neglect of this doctrine is rather due, I think, to the strongly-rooted opinion that the mind, or soul, is always conscious; for, since the time of Descartes, who identified the mind and consciousness, to affirm that man was ever unconscious was held to be virtually a denial of the continued existence of the soul, and therewith of all the dogmata which were deduced from the doctrine of Descartes. Nothing shows more conclusively the influence of this doctrine than Sir William Hamilton's own views as to "latent" consciousness and continued consciousness (55, 59), and which appear to me to be essentially contradictory. And I have found that some of my critics, who have discussed my doctrine of unconscious cerebral action, have refused to admit even the possibility of it, on the ground that unconscious mental action is a contradiction; while others, acknowledging the validity of the facts upon which it is founded, have been wholly unable to shake off the trammels with which preconceived notions have restricted their minds, so as to deduce the practical conclusion that vital successional states and conscious successional states are due to a common law—a law of design, which includes both.† Such a law of design logically implies Thought somewhere; and Thought, ideas. Hence, as applied to the vital phenomena which correlate states of Thought, the notion of "material" ideas, or something similar, necessarily enters into all reasonings on these modes

† See the history of the development of this doctrine, by the Author, in Appendix to vol. ii. of this Work.

of existence in which an intelligent order of phenomena is manifested without consciousness; and even when these physiological hypotheses are not entertained, the fact remains nevertheless,—namely, that these vital phenomena are in necessary relation to those states of existence termed "latent consciousness," and the like. To express that fact in language, when the organisation was left out of consideration, it was necessary to use the term Mind in a sense which made it synonymous with organisation. Hence the use of phrases by Leibnitz and others, such as "insensible perceptions," "perceptions without apperception," "latent consciousness," "unconscious mental states," and the like. All these terms are really applicable to *vital* sequences occurring in the organ of thought, without any consciousness or knowledge of them or their results on the part of the individual; which sequences occur, however, according to mental laws, as revealed to us by or in consciousness.

67. Leibnitz was not a mere speculative philosopher. On the contrary, he was in active correspondence with many of the leading physiologists and physicists of his day, and took an interest in natural history and medicine as well as in mathematics, philosophy, the history of letters, poetry, political economy, and the like. He looked upon all science as the true treasure or good of humanity, and termed himself *Placidius*.* "La mèdicine," he remarks, "est la plus nécessaire des sciences naturelles. . . . Elle est la plus haute point et comme

* Compare Erdmann, *Oper. Philos. Leibnitii*, Berl. 1840, p. 91; and especially Dr K. F. H. Marx's *Gottfried Wilhelm Leibnitz in seinen Beziehungen zur Arzneiwissenschaft; in Abhand. der König: Gesellschaft der Wissensch: zu Göttingen.* This learned paper is published separately (4to, 1859), and is an interesting memoir of Leibnitz in his relations to the medical sciences.

le fruit principal des connoisances du corps par rapport au nôtre. Mais toute la science physique, et la médicine même, a pour dernier but la gloire de Dieu et le bonheur suprême des hommes."* And he lamented the neglect with which the relations of body and mind were generally treated: "L'ou peut dire, que c'est une veritè aussi certain que dèplorable, que l'ame et le corps sont les premières choses auxquelles on devroit penser, et les dernieres auxquelles ou pense."† The great teleological principle which runs through natural phenomena he embodied in a comprehensive aphorism: "Neque enim aliud est Natura, quam Ars quædam magna."‡ His *Protogœa* was a sort of "vestiges of the natural history of creation;" for at the close he remarks: "rerum naturæ præstat nobis Historia vicem;" while the full title of the work, as edited by Scheid, expressed the same idea. "PROTOGÆA, seu de prima facie telluris et antiquissimæ historiæ vestigiis in ipsis naturæ monumentis, dissertatio,§ &c." Hence he looked upon all organisms as machines, but originating in mind: "dici possit corpora naturæ organica reverà machinas divinas esse;"‖ and therefore, in controverting certain of the views of Stahl, he remarks, "Etsi omnis actionum fons sit in anima, nihil tamen fit præter corporis leges." It is obvious, therefore, that the doctrine of Leibnitz as to latent and unconscious mental states was really developed from a comprehensive view of the facts of natural history, including palæontology; and based upon biological principles, which were afterwards to have a fuller exposition and application by Wolff, Göthe, Oken, G. St Hilaire, Lamarck, Cuvier, Blainville, Grant, and Owen.

* *Leibnitii Opera Omnia*, Ed. Dutens, tom. ii. p. i. p. 262.
† *Ibid.* tom. ii. p. ii. p. 163.
‡ *Protogœa*, § 9.
§ *Göttingen*, (4to, 1749).
‖ *Opp.* tom. ii. p. ii. p. 131.

CHAPTER VII.

INSTINCTIVE EXISTENCE.

Sect. I.—*The Conclusions of Experience.*

The differences and resemblances between man and the higher vertebrates have always attracted the attention of mankind. The differences as to form and structure are so well-marked, when extreme examples are compared, that no doubt can arise as to the necessity of recognising a fundamental distinction between the animal and the man. Yet, on the other hand, when the resemblances are examined, and the closest examples of similitude are taken for comparison, it becomes extremely difficult to deny the near approximation of brute to man. Although I have already touched upon this part of the subject in discussing the Method, it will be useful to revert to it again.

68. The conclusions of mankind as to the mental constitution of man, when compared with that of lower animals, have followed the same course. Taking extremes of difference for comparison, the difference between man and his fellow-creatures is great; but taking the extremes of resemblance, the similarity of man and lower animals is equally remarkable. Practically, man acknowledges that, in all essential characters, he is to be classed with his fellow-creatures. Hence the proposition that man is an animal. Certain animals are the com-

panions of man; they are his helpmates, friends, guardians. Now, in transacting with these creatures the ordinary business of life, man treats them, *mutatis mutandis*, as he treats his *brother* man. If he educates them, it is according to the same methods that he follows when educating his children: he disciplines them into habits; he communicates with them by language. He loves and hates them, and he is loved and hated by them, just as he loves and hates or is loved and hated by his fellow-men. He sympathises with their feelings; they sympathise with his. Nay, he protects them from suffering and injury by special laws, just as he protects his children, his serfs, or his slaves. And the American slave-owner exercises over his slave the same discipline which he exercises over his horse or his dog; he even likens the two so habitually, as to question, on scientific grounds, if not deny, the humanity of the African he holds in bondage. Now, philosophers, in speculating on the mental differences between man and animals, have attributed to the man *reason*—to the animal *instinct*. Hence, animals are irrational, men rational beings. Instinctive actions are not founded on knowledge or experience; rational actions are. Instinct is the *cause* inherent in animals of those proceedings on their part which take place, not only without experience as to the past, but without any conscious adaptation to accidental circumstances, and without any knowledge of the results to follow the course of proceeding. In short, in instinct there is what is termed a blind intelligence—*i.e.*, an intelligent adaptation of actions to ends, but without knowledge of the past, present, or future.

69. These conclusions from grounds of difference are only true, it is to be observed, as to cognitions derived from experience; they are not true as to feelings and

emotions that are independent of experience. Lower animals feel pain when injuries are done to them—man is not different from them in this respect, except as to degree. So, too, as to many sentiments and emotions. It is a recorded observation as old as Aristotle, that animals manifest prudence, cowardice, courage, benevolence, the social feelings, the conjugal and parental affections, friendship, and the like—all of which are purely instinctive in man.

70. Nor do the resemblances cease with animal life. If we consider the meaning of the term Instinct, in its widest application, as manifesting a blind, unconscious adaptation to ends, the actions appropriate to nutrition or alimentation, and of respiration or aeration of the tissues, are instinctive. The acts by which these objects are attained may or may not be associated with states of consciousness; and even when there is a concurrent feeling of pleasure or pain experienced by the organism, we observe that there is coincident therewith only an aiding or intensification of the actions; the actions themselves are done independently of a knowledge of their order, or cause, or object. And there are other vital processes of a similar kind, as to object, which are even more independent of mental states than these, as will be shown subsequently; for they are certainly performed without any consciousness whatever. Hence Instinct, in this more general sense, is a property of vegetable organisms as well as of man. It is therefore the supposed cause of all those acts which are performed either without any mode of consciousness absolutely—that is, unconsciously; without any knowledge, on the part of the individual, of the ends to be attained by the acts; or without any volition. Thus Dr Reid: "He [a newborn child] is led by nature to do those actions [of suck-

ing, swallowing, &c.] without knowing for what end, or what he is about. This we call *instinct.*"*

71. There is no word more commonly in use by everybody than this word *Nature*. Thus the logician and philosopher speak of the order of nature, the laws of nature, the phenomena of nature, meaning thereby the universe, or cosmos. The physicist speaks of the nature of things, as rocks, metals, compounds; the naturalist, of the nature of plants, animals; the moral philosopher and theologian, of human nature and the nature of God. In all these the word really signifies that each thing to which it is applied has modes of existence special to itself, with special relations to other things; and that both modes and relations are invariable, or, if variable, vary within certain limits only. Or, in other words, in this use of the word the idea of necessary order with a view to ends is involved; for there cannot be the idea of invariable order without, at the same time, the idea of design. Hence *kosmos*, the Greek work for order, is also the term for nature at large, or the creation. This idea of design implies an efficient cause of a mental character; and thus the word Nature comes to be used in the sense in which Reid uses it as a director or teacher, or as the efficient cause of the adapted actions of organisms, working without their knowledge. In this case, Nature is obviously but another word for Instinct. Now the ultimate *fact* expressed in the word is order according to a law of design, without consciousness on the part of the thing ordered. In this sense, Nature is but another term for life.

SECT. II.—*The Conclusions of Philosophy.*

72. It is a matter of experience that many of the

* *On the Active Powers*, Essay II. chap. ii.

actions of lower animals are closely similar to the operation of the highest intelligence; so that if man be instinctive as to many of his actions, animals are intelligent as to many of theirs. The logical conclusion from those facts would necessarily be, that there is a fundamental identity of mental nature between men and other conscious beings; but this has been repudiated, as we have seen, and instinct has been usually attributed, when manifested in lower organisms as Thought or Intelligence, to the direct operation of the Almighty, or to something Divine. Thus Reid: "When a bee makes its comb geometrically, the geometry is not in the bee, but in that great Geometrician who made the bee, and made all things in number, weight, and measure."*

73. Nevertheless, although speculative philosophy repudiates this community of nature, and limits the term "instinctive" to those actions which are performed blindly and ignorantly, or at least independently of knowledge and volition, the philosophy of common sense teaches otherwise. It clearly shows that all our mental operations are, in fact, instinctive in their nature. Reid maintained, in especial, the instinctive character of our beliefs, cognitions, judgments; it is a fundamental principle in his philosophy, pervading the whole of it, and is thus defended by Sir William Hamilton: "An instinct is an agent which performs blindly and ignorantly a work of intelligence and knowledge. The terms *instinctive belief—judgment—cognition*—are therefore expressions not ill adapted to characterise a belief, judgment, cognition, which, as the result of no anterior consciousness, is, like the products of animal instinct, the intelli-

* *On the Active Powers*, Essay III. part i. chap. 2.

gent effect of (as far as we are concerned) an unknowing cause. In like manner, we can hardly find more suitable expressions to indicate those incomprehensible spontaneities themselves, of which the primary facts of consciousness are the manifestations, than *rational or intellectual instincts.*"* It follows, therefore, that the same energy which acts as instinct, and is esteemed a *quoddam divinum* in lower organisms, is identical with the energy acting as instinct, and termed Soul in man.

74. The instinctive character of the mental faculties of man has been fully recognised by philosophers of all times, just as, conversely, the rational character of the mental faculties of lower animals has been recognised by the common sense of mankind. The phrenologists are on this point in entire accord with the metaphysicians. Sir William Hamilton thus defends Dr Reid for adopting this view of the true character of the human mind: "If Reason can be justly called a developed Feeling, it may with no less propriety be called an illuminated Instinct; in the words of Ovid,

"Et quod nunc Ratio, Impetus ante fuit."

As to [Reid's use of the term] being an innovation either in language or philosophy, this objection only betrays the ignorance of the objector. Mr Stewart (*Essays*, p. 87, 4to edition) adduces Boscovitch and D'Alembert as authorities for the employment of the terms "Instinct," and "Instinctive" in Reid's signification. But before Reid, he might have found them *thus* applied by Cicero, Scaliger, Bacon, Herbert, Descartes, Rapin, Pascal, Poiret, Barrow, Leibnitz, Musæus, Feuerlin, Hume, Bayer, Kames, Reimarus, and a host of others; while, subsequent to the *Inquiry into*

* Sir William Hamilton. *Loc. cit.*

the Human Mind, besides Beattie, Oswald, Campbell, Ferguson among our Scottish philosophers, we have with Heimsterhuis in Holland, in Germany, Petens, Jacobi, Bouterwek, Neeb, Köppen, Ancillon, and many other metaphysicians, who have adopted and defended the expression. In fact, Instinct has been for ages familiarised as a philosophical term in the sense in question—that is, in application to the higher faculties of the mind, intellectual and moral. . . . In a moral relation, as a name for the natural tendencies to virtue, it was familiarly employed even by the philosophers of the sixteenth century, . . . and in the seventeenth it had become, in fact, their usual appellation."*

75. As an illustration of the conclusions on this subject to which almost every thinker has been led, the teaching of Sir Matthew Hale may be quoted, who maintained that as we see in brutes there are lodged certain sensible instincts, antecedent to their imaginative or sensitive faculty, whereby they are predetermined to the good and convenience of the sensible life; so there are lodged in the very constitution of the soul [of man] certain rational instincts, connaturally engraven in it—antecedently to any discursive ratiocination—whereby it is predisposed, inclined, and biassed to the good and convenience proportionable to a rational and intellectual life.† Sir Mathew Hale, by the phrase "rational and intellectual life of man," meant to express his moral and religious capacities; and by rational instincts he meant also the "speculative and moral." But Kant and Mr J. S. Mill have shown that the process of reason itself is instinctive in its character—the former not perhaps stating the doctrine explicitly, but clearly implying it. Thus his

* *Opere, et loco citato.*

† *Primitive Origination of Mankind*, § 1, chap. ii.

theory of *à priori* intuitions—that is, of ideas or conceptions anterior to all experience, and therefore inherent in man's nature—is only another mode of stating that the fundamental processes of the intelligence are instinctive. The term Intuitive connotes, in fact, the necessary modes of thought precisely in the same way as the term Instinctive connotes necessary modes of action. All our *à priori* judgments, considered as acts, are therefore instinctive judgments, and such, indeed, they are usually designated. Nay, Kant uses phrases in regard to the understanding exactly similar to those applied to instincts. Thus, *synthesis*, or "the process of joining different representations to each other, and of comprehending their diversity in one cognition," is described by him as "a blind but indispensable function of the soul, without which we should have no cognition whatever, but of the working of which we are seldom conscious."*

76. Nor, when the reasoning faculty of man is analysed and resolved into its elements by the logician, is the resemblance of the different steps of the process in man and lower animals less striking. On the contrary, when a comparison is made, the result is a distinction so subtle, that it proves most conclusively, that the difference between the mental nature of men and animals is one of degree only, and by no means of kind—that, in fact, the same laws are applicable to both classes of faculties, even as to the higher mental manifestations. Thus, Mr J. S. Mill shows that the lower animals use the method of induction in thought. "If reasoning be from particulars to particulars, and if it consist in recognising one fact as a mark of another, or a mark of a mark of another, nothing is required to render reasoning possible except senses and

* *Kritik der Rein: Vernunft.* Transcendental Logic, chap. i. §§ 3–6.

association: senses to perceive that two facts are conjoined; association as the law by which one of those facts raises up the idea of another. For these mental phenomena, as well as for the belief or expectation which follows, and by which we recognise as having taken place, or as about to take place, that of which we have perceived a mark, there is evidently no need of language. And this inference of one particular fact from another is a case of induction. It is of this sort of induction that brutes are capable; it is in this shape that uncultivated minds make almost all their inductions, and that we do so in the cases in which familiar experience forces our conclusions upon us without any active process of inquiry on our part, and in which the belief or expectation follows the suggestion of the evidence with the promptitude and certainty of instinct.*

77. Thus, then, Thought and Instinct can be generalised under the same term; and what, when thus generalised, is common to both? This; that each is the manifestation of a law of necessary adaptation to ends. The man ceases to be rational when he aims not at an adaptation to ends. Instinct, we have seen, is that adaptation itself. In trying to realise from the side of instinct a more general conception of *soul*, or *mind*, we find that it contains three elements. 1. There is the *law* of necessary adaptation to ends. 2. There is the pure reason or thought, the "*quoddam divinum*," by which the ends are conceived, and the machinery and methods for attaining them designed. 3. There is the force or energy which is manifested in and by the law of necessary adaptation to ends, and which is active or operative in accordance with the conceptions of the pure Thought, so that the

* *System of Logic*, 4th edit., vol. ii. pp. 202–3.

machinery necessary to attain the end is constructed out of matter, and worked appropriately when so constructed. Now, these three elements enter into the intellectual as well as the instinctive nature of man. A fourth needs to be added, *i.e.* consciousness, as the common characteristic of all. Consciousness of adaptation to ends, or Thought; consciousness of the successive events necessary to secure adaptation, or Knowledge; consciousness of the exercise of the power or energy used in the actual adaptation, or Will; and, finally, the *feeling* associated with the processes—the Desire to attain an end, and to adapt to the attainment; the Desire to attain the knowledge necessary to secure the adaptation; the Desire to exercise the power necessary; and, finally, the Pleasure or Pain consequent upon the attempt at adaptation with the success or failure.

78. We may also infer the differences between man and animals. Human nature is *constituted* for higher ends than mere animal nature; for however degraded the man may be, he possesses human capacities and human intuitions potentially, at least. Man's mode of procedure differs also. The rational man adapts to ends, imperfectly knowing, and seeking to know more perfectly, the order of phenomena, that he may duly adapt; the instinctive animal adapts to ends, not knowing or seeking to know more perfectly the order of the phenomena. The intellectually rational animal, Man, is generically capable of the knowledge; the purely instinctive animal is not capable. Between the highest and lowest capability of knowledge, both in man and animals, there is a long series of degrees of capability; but the law of continuity is manifest throughout, so that nowhere in the series can the line of demarcation be strictly drawn, and it may be said, Here ends instinct, here begins reason.

79. It follows, then, from all these considerations, that all those general phenomena of mind which we have already investigated are instinctive in their character; or, in other words, are due to the same cause or causes, and occur according to the same laws, as the mental phenomena of lower animals. Now, these phenomena are vital; consequently, the mental phenomena of man are vital.

By successive generalisations of the facts and propositions of experience, we thus arrive at the ultimate generalisation attainable, and the phenomena of life are brought under the same efficient cause — a spiritual Energy—as the phenomena of mind. Nowhere can we draw a line of demarcation between these phenomena as to causation, so that the soul, considered as an Energy, acts equally in nutrition, development, and instinct, in all states of consciousness, and in all intellectual operations whatever. These phenomena are but varying manifestations in time and space, through matter, of the same spiritual thing. *Soul* operates in all. So that, by the operation in matter of the "immaterial *Ego*," according to the necessary law of adaptation, vital force and nervous force, instinct or blind adaptation, and reason or conscious adaptation, are variously developed into activity, as modes of action of the same force, according to that law of adaptation itself; and thus the vital and the mental forces and functions are but manifestations of the same pure thought in action. This generalisation is exhaustive, being co-extensive with all the phenomena of creation, and is the only generalisation which can comprehend both the phenomena of Life and Mind.

CHAPTER VIII.

SPECULATIVE ONTOLOGY.

SECT. I.—*The General Relations of Life to Consciousness considered as Universal and Particular.*

HAVING, by the method laid down, brought the phenomena of Life and Thought into unity as Existence, our next step takes us on to a special inquiry into the nature of the fundamental elements of this unity, and their relations to each other. We have seen that they are two —Mind and Life. What, then, is the nature of mind and life, and what their relations to each other as they constitute the one individual man?

80. The discussions as to the nature and laws of Existence have been endless. It would be wholly foreign to the plan of this work, and far indeed beyond my pretensions, to give an account of the various doctrines thus raised and advocated, and the objections and difficulties with which they have been met. It will be sufficient to indicate a few broad outlines taken from our own point of view.* The opposing philosophers may be divided, in the first instance, into two classes—namely, those who identify consciousness with Being, and those who identify mind with Being. The former include the majority of

* Mr G. H. Lewes will be found an excellent guide (in his *Biographical History of Philosophy*) as to the nature and scope of ontological speculations from the metaphysical point of view. Compare especially part ii., *Modern Philosophy*.

the British and French schools, and the followers of Kant in Germany; the latter the followers of Fichte, Schelling, and Hegel. Now, the theories of the former school, as to the connection between mind and matter, have been established (as we have seen) for the most part on the erroneous assumption that mind can be a subject of inquiry independently of matter; or, in metaphysical phrase, can be known and conceived *per se*. But this assumption being contrary to experience (47), the solution of the problem was not reached, and, as a farther consequence, all theories based upon it as to the nature of Being were necessarily false. The extent of error is not the same with all metaphysicians of this school, for not a few deep thinkers have felt strongly the sources of fallacy lying in the primary postulate. Of this class may be mentioned, as an example, the able Professor of Moral Philosophy at St Andrews. It is plain, however, that he has been restricted in the development of his own views by the same difficulty as others. His fundamental proposition is, "That whatever any intelligence knows, it must, as the ground or condition of its knowledge, have some knowledge of itself."* Here "intelligence" is a term synonymous with "being" and "self." "*Ego*," "self," "me," are also used as synonymous with "intelligence," and with mind in the abstract. To all these things the fundamental notion of conscious activity is added. The "intelligence," "self," "me," "*Ego*," must have knowledge of self; that is to say, must be self-conscious. But if mind be another form of life, continued consciousness is not its necessary characteristic. The "intelligence" of Professor Ferrier is consequently a being which apprehends under the fun-

* *Institutes of Metaphysic*, prop. i.

damental distinctions of *self* and *not-self;* as such it cannot apprehend either the one or the other without apprehending its correlative. But as an animal, or animal-being, sometimes neither self nor not-self, is apprehended by it—*i.e.*, it is unconscious. And as Professor Ferrier identifies intelligence with mind and consciousness, he finds it necessary to meet the admitted objection to his fundamental proposition, that it is contrary to experience, by showing that we are really always conscious of ourselves, but do not know it, in consequence of "a principle of our nature which may be termed the Law of Familiarity, the effect of which law is well expressed in the old adage, 'Familiarity breeds neglect.'" Professor Ferrier acknowledges that the oversight of ourselves in cognition is, "in many cases, all but complete;" and for his argument he only requires that, of our consciousness, "the thousandth part, or even a smaller fraction, be perpetually directed upon ourselves." But, unfortunately, experience will not allow of a hundredth-thousandth part. This is only another form of the psychological assumption that mind and consciousness are identical, and life and mind distinct; and the requirement which Professor Ferrier demands is rendered necessary by his adopting this assumption. Now, not being true in fact, it cannot be adopted into a theory; otherwise the theory would be at variance with all our experience of the phenomena of human nature.

81. I subjoin an illustration of this defect in Professor Ferrier's terminology. "Whatever else a man may be, he is, at any rate—himself. He understands what he means when he utters the word 'I;' and therefore, when such terms as 'mind,' 'subject,' or 'intelligence,' are employed in these pages, they are to be regarded

as strictly synonymous with this less ambiguous though egotistical monosyllable."* But does the word "I," as commonly used, mean what Professor Ferrier states? It rather expresses the "concrete *Ego*." Let Mind be substituted for the personal pronoun in speech, and it will be seen that the *Ego*, as thus used, implies the "cognition," or consciousness, of Existence, and not mind simply; but Existence implies the synthesis of the subject and the object—the union of the universal and the particular. The *Ego* is not, therefore, intelligence or mind, but a cognition of mind in synthesis with matter. Hence mind must be something more than the state of consciousness termed the *Ego*, which is simply a state of conscious existence, as unity. What that mind is, we will shortly endeavour to determine. In the meanwhile, we must adhere strictly to the facts of experience, and not vary even the millionth part.

82. Whenever Professor Ferrier uses the *Ego* strictly as significant of mind in the abstract, his views are admirably clear. Thus, as to what is Absolute Existence—the thing of which the *Ego* is the consciousness—he remarks: "Absolute Existence is the synthesis of the subject and object—the union of the universal and the particular—the concretion of the *Ego* [mind] and *Non-Ego;* in other words, the only true, and real, and independent Existences are minds [*Egos*], together-with-that-which-they-apprehend."† And again: "It was formerly remarked (p. 163), that the equation, or coincidence, of the known and the existent is the ultimate conclusion which philosophy has to demonstrate. This demonstration has been supplied, and the conclusion reasoned out from the bottom. The universal and the

* *Institutes*, p. 247. † *Ibid.* prop. x. p. 500.

particular *Ego* [mind] and *Non-Ego* in *cognition*, are also, in all essential respects, the universal and the particular *in existence;* or, expressed more popularly, the conclusion is, that every true and absolute existence is a consciousness [mind or *Ego*], together-with-its-contents, whatever these contents be. Thus, Knowing and Being are shown to be built up out of the same elements; and thus the laws of cognition are demonstrated to be in harmony with the laws of existence; and thus psychology, the whole spirit of whose teaching is to inculcate the frightful doctrine that there is no parallelism between them, is overthrown." "The absolutely Existent which each of us is individually cognisant of, is—himself-apprehending-things-*by-the-senses* [*i.e.* conscious]. A man cannot be cognisant of himself [*i.e.* his mind] merely, or of things merely, or of senses merely. He therefore cannot be cognisant of these three as existences, but only as factors or elements of existence; and the only true and absolute existence which we can know is, as has been said, their synthesis—to wit, himself-apprehending-things-*by-the-senses* [*i.e.* conscious]. Now, the circumstance to be particularly attended to is, that the part of the synthesis here printed in italics is contingent in its character. Our five senses are the accidental part of the absolute in *our* cognition; they are not a necessary part of the absolute in *all* cognition, and therefore they are not a necessary part of every absolute existence. Other intelligences may be cognisant [*i.e.* conscious] of themselves, apprehending-things-*in-other-ways-than-we-do.* In which case *their* absolute, both in cognition and existence, would be different from ours in its *accidentals*, but not in its *essentials.** Such being the case, we cannot investigate

* *Institutes*, pp. 504–6.

the nature and laws of mind apart from the laws of existence. The *Ego*, or self, or mind, *per se*, is, of necessity, absolutely unknowable. By itself—that is, in a purely indeterminate state, or separated from all things, and divested of all thoughts—it is no possible object of cognition. It can know itself only in some particular state, or in union with some *Non-Ego;* that is, with some element contradistinguished from itself.* This element is matter, or its forces.

83. The other class of philosophers start also from Consciousness as a basis of certitude; but they pass from thence to a conception of the *Ego* as the cause of both life and thought. Thus, the *Ego* represents mind in the abstract. The *Ego* is represented by the will. "I stand between two worlds," says Fichte, "the one visible, in which the act alone avails, and the intention matters not at all; the other invisible and incomprehensible, acted on only by the will. In both these worlds I am an effective force. The Divine life, as alone the finite mind can conceive it, is self-forming, self-representing Will, clothed to the mortal eye with multitudinous sensuous forms, flowing through me and through the whole immeasurable universe,—here streaming through my veins and muscles, there pouring its abundance into the tree, the flower, the grass. The dead, heavy mass of inert matter, which did but fill up nature, has disappeared, and in its stead there rushes by the bright everlasting flood of life and power, from its Infinite Source. The Eternal Will is the creator of the world, as He is the Creator of the finite reason."† In Schelling's system these last mentioned ideas of Fichte had their logical development. The *Ego* in Fichte's system is the human

* *Institutes*, prop. ix.

† Mr Lewes. *Biogr. Hist. of Philos.* p. 581.

soul—in Schelling's it is the Absolute, the Infinite, the All which Spinoza called Substance, and which the ancients termed the *Logos* or the One; and this Absolute manifests itself in two forms—those of the *Ego* and the *Non-Ego*, or as Nature and Mind.

84. These and similar views have led to the development in Germany of numerous systems of physio-philosophy, or *natur-philosophie*, of singular subtlety and depth. Schelling developed an interesting system of the kind, in which he makes the law of polarity the universal law of Nature, and applies it deductively to an explanation of the phenomena of physics, chemistry, and organic life. Göethe, Oken, and others, also developed systems of this kind, in which the fundamental idea is that life and consciousness are due to a common cause, and that is Mind. The physio-philosophy of Oken is one of the most remarkable products of the human intellect in modern times. Its fundamental doctrines have a striking resemblance to those which have been termed Pythagorean; while its details are applied to the phenomena of creation with a freedom and a boldness which render it greatly attractive. Its leading fault is that of all these German systems—namely, a sort of scientific mysticism, utterly opposed to the spirit and methods of the inductive philosophy. Oersted, in Copenhagen, gave a more practical turn to the speculations of the German physio-philosophers, and rendered them subservient to the experimental discovery of great general laws. The influence exercised by these speculative systems upon scientific progress varied much; some were almost wholly ethical in their tendencies, others metaphysical, and hardly had any influence whatever. It may be stated generally, however, that whenever the *à priori* deductions of these systems were such that they could be verified by obser-

vation or experimental research, they advanced science, as all true *à priori* deductions necessarily do.

85. In Ontological speculations of this kind, the phenomena of Consciousness are distinguished from the phenomena of Mind or Reason. Consciousness is not Being—only a state of being. Mind, as the cause of Being, is *manifested* in consciousness (which is indeed its highest manifestation); but it is variously manifested in the phenomena of life (14), before consciousness is a phenomenon of animal existence. Consciousness is a consequence of life, and is only a manifestation of mind as that is manifested in vital phenomena. And it followed from this, that the phenomena of consciousness only represented mind as manifested in organic life—not as manifested in creation at large, and consequently not as absolute Being.

86. It is not necessary for our purpose to follow these speculations further. We have arrived at what may be assumed to be a solid basis for inquiry. 1. Human Existence may be said to be dependent on the union or synthesis of body and soul, or mind and matter into one —a unity with correlative causes and laws, constituting "the concrete *Ego*," or individual. 2. Our conscious states are the sources of all our knowledge: that is, when vital processes are coincident with certain mental states, we know, or have knowledge. Unless there be this coincidence, we have no knowledge of our Existence, or of *self* and *not-self*—that is, are unconscious, and can have no knowledge of things. Hence it is that metaphysicians have found it necessary to make our cognitions or knowledges the starting-point of inquiry into the laws of Existence. These states of consciousness may be classed very variously, but ultimately they are capable of arrangement as generalisations of the experience of man-

kind. How that experience is reached, and what its validity, are questions which have been long discussed. As a result of these discussions, it is practically concluded that it can only be reached under certain conditions, which have been termed the necessary conditions, or laws of thought. These laws of thought, in and by virtue of the operations of the mind in them—that is, during experience—are recognised at last as truths, and are in this way the results of experience. Nevertheless, the cognition of these laws as intuitions, axioms, and the like, is one thing—their operation is another thing. The one is only a mode of Egoistic or conscious mental activity, the other is a mode of absolute mental activity. Hence those only are true generalisations of experience —that is to say, true general cognitions reached by the laws of thought—which are universally applicable. Each "concrete *Ego*" has its own special modes of thought, adapted to its own infinitely varying relations. These are true as to its own special states of consciousness, but not necessarily true as to the special states of other individuals; they are singular, special, contingent cognitions; but in all there are equally present common modes and laws of thought which are universal, absolute, fixed, necessary, &c.

SECT. II.—*The Relative and the Correlative in Existence.*

87. Metaphysic has thus placed us in the same position as experience. We have what we call *mind* and what we call *matter*, in such relation to each other that both Animal Existence and a knowledge of its laws are wholly dependent upon their relations to each other. For without Mind, as a cause operating on matter, there could be no animal existence; without Existence, no

vital phenomena; without phenomena, no consciousness and no knowledge of Mind or Existence, or their laws. It is clear, therefore, that upon an inquiry into these relations, rests the whole superstructure of a mental science.

88. But it is to be noted that neither metaphysic nor experience tells us anything of these relations of consciousness to organisation; yet it is the proper business of metaphysic to explain the nature and laws of experience, by explaining these relations. All states of consciousness being coincident with vital changes, it is obvious that all our cognitions must be equally coincident with vital changes. And as the class of speculative ontologists maintain that the phenomena of life are due to mind, or pure reason, as a cause, it is doubly incumbent upon them to correlate the laws of the pure reason, as manifested in cosmic and vital changes, with its laws as manifested in states of consciousness termed cognitions, and the like. As to the psychologists, no such course is possible; for they have wholly divorced *ab initio* the phenomena of Life and Thought. This has resulted, in truth, because experience fails us in the most fundamental generalisation of experience—the act of simple self-consciousness. For this is such (p. 53) that we have a conviction contrary to true experience—namely, that mind is operating in us as a something out of relation to matter. It is doubtless an intuition of the absolute—that is, of mind in the abstract, as a cause—and, as such, is true; but as such, it is an intuition not evolved into knowledge, except as the result of the most extensive experience and of the highest generalisation. As it is the first and most fundamental intuition of thought, so it is the last-evolved and most general truth of reason.

89. Now, the method by which man arrives at a knowledge of all truth whatever, is one and the same. It consists

simply in an investigation of things in relation to each other. On no point is philosophy more unanimous than on this. The logic of the relative and correlative in cognitions is well summarised in a note on the "Doctrine of Relation," by Sir William Hamilton.* Every relation supposes at least two things: a relative not referred—not related—is an overt contradiction. The absolute, the one—the not-relative, not-plural—is diametrically opposed to the relative. "A relation is a unifying act—a synthesis; it therefore constitutes a unity—the one. But in cognition it is likewise an antithesis, even when the terms are identical; for in the formula A = A there is the discrimination and opposition of the two terms. Relation is essentially duality as to numbers of parts or elements, not plurality. The opposite to a relative is the correlative. The relative is what is referred; the correlative, what it is referred to. They can always be reciprocated, or converted. Thus, if we think of the father as relative, and the son as correlative, we can change the terms and think of the son as relative. In this change of mode of cognition we arrive at formularised relations, which are relative and correlative. The relation of the father to the son is Paternity; of the son to the father, Filiation. But there can be no filiation without paternity, and *vice versa*. So also as to the relations of cause and effect. Finally," Sir William adds, "the relatives (the things relative and correlative), as relative, always co-exist in nature (ἅμα τῇ φύσει), and co-exist in thought (ἅμα τῇ γνώσει). . . . Relative and correlative are each thought through the other; so that in enouncing Relativity as a condition of the thinkable—in other words, that thought is only of the Relative—this is tantamount

* Note *e*, Appendix, *Lectures on Metaphysics*, vol. ii. p. 535.

to saying that we think one thing only as we think two things mutually and at once ; which again is equivalent to a declaration that the absolute (the non-relative) is for us incogitable, and even incognisable. In these conditions of Relativity, all philosophers are at one ; so far there is among them no difference or dispute."*

90. "The relative," Professor Ferrier remarks, in accordance with these doctrines, "is whatever can be known or conceived only when a correlative is known or conceived along with it. But that which can be known or conceived only when a correlative is known or conceived along with it, cannot be known or conceived by itself. Therefore, there is no *mere* relative in cognition ; in other words, the relative *per se*, or by itself, is, of necessity, unknowable and unknown."† Again, "Whatever can be known (or conceived) *out of relation*—that is to say, without any correlative being necessarily known (or conceived) along with it—is the known absolute. But some such thing must be known, otherwise all knowledge would be impossible," &c.‡ In like manner the law holds good as to existence—for Knowing and Being are coincident. Hence Professor Ferrier argues, "All absolute existences are contingent, *except one ;* in other

* For illustrations of one or two of the various modes in which the law of Relation is applied to mental science, the reader is referred to Dr Whewell's *History of Scientific Ideas* (3d edit. 1858, vol. i. chap. i.), where it is developed as the fundamental antithesis of philosophy ; and more particularly to Mr H. Spencer's *Principles of Psychology*, of which it is the basis. It is especially worked out in his theory of reasoning. Nothing is more certain in mental science than that this law of Relation, or Relativity, is the law of all thought. We shall shortly see that it is equally the law of all phenomena.

† *Institutes*, p. 355.

‡ *Ibid.* p. 362.

words, there is one, but only one, Absolute Existence, which is strictly *necessary;* and that Existence is a supreme, and infinite, and everlasting Mind, in synthesis with all things."* Again, "In the judgment of reason there never can have been a time when the universe was without God. That is unintelligible to reason; because time is not time, but is nonsense, without a mind; space is not space, but is nonsense, without a mind; all objects are not objects, but are nonsense, without a mind; in short, the whole universe is neither anything nor nothing, but is the sheer contradictory, without a mind.†

91. Not otherwise is it in cognition. The first acts of self-consciousness are, to divide the unity of consciousness, or existence, into the *me* and *not-me*, and then to divide the unity of the *me*, or concrete *Ego*, into mind and body. And so also in our cognitions of things in general. "Take any attribute whatever," Mr J. S. Mill remarks, "and if some things have it, and others have it not, we may ground on the attribute a division of all things into two classes; and we actually do so the moment we create a name which connotes an attribute."‡ Duality, as Relativity, is the condition of the Thinkable; or, as Sir William Hamilton adds, we think one thing only as we think two things mutually at once (89). Hence, reduced to physiological terms, the "universal" is the consciousness of existing continuously as one, derived from the continuous operations of the vital forces which constitute the living body into one; the "particular" is the consciousness of the present relations as one, to the changes induced by the operation of those vital forces acting to unity, which are set up either by causes applied and operating from with-

* *Institutes*, prop. xi. p. 510. † *Ibid.* p. 511.

‡ *System of Logic*, 4th edit. vol. i. p. 136.

out, or in consequence of the operation of one portion of the body upon another portion within. Or, in metaphysical language, the *universal* is the *Ego*, or personal identity; the *particular*, the ever-changing, vital, or material forces. Consequently, if these propositions be admitted, it follows deductively, that in all our modes of consciousness, and in all forms of Being, there is both a relative and correlative, and an absolute and relative. Consequently, an absolute in synthesis with all things —*i.e. Existences*—must be an element in all Existences; and since consciousness and existence (Knowing and Being) are coincident, there must be necessarily a like absolute in all cognitions. Now, what is this common absolute of Thought and Existence? According to the proposition, it is the Supreme, All-pervading Mind.

92. The metaphysical discussions that have arisen out of this fundamental mode of cognition are endless. The absolute was found to be also the necessary and the invariable as well as the "universal;" and therefore to correlate the "particular," "singular," variable, and changeable, which, in such correlation, constitute the infinitely-varying unities of thought. The nature of "universals," and "singulars," or "particulars," was discussed from a very early period of philosophy, probably long anterior to the time of Plato. Plato, however, gave the fullest development to the doctrine of the identity as to cause of Knowing and Being. His doctrine, "as may be inferred from a liberal interpretation of the Platonic Philosophy" (to use Professor Ferrier's words), "was, that the known and the existent are coincident. The particular and the universal in existence were declared to be, in all respects, identical with the particular and universal in cognition. And, doubtless, this coincidence is the highest truth which Philosophy seeks to

establish—is the sublimest lesson she can teach. To this end all her labours are directed, all her instructions minister. To prove it, is to reach the TRUTH."* But the truth must be proved—not assumed or surmised. Plato surmised it only. "Nevertheless, if Plato was confused and unsystematic in execution, he was large in design, and magnificent in surmises. His pliant genius sits close to universal reality, like the sea which fits in to all the sinuosities of the land. Not a shore of thought was left untouched by his murmuring lip. Over deep and over shallow he rolls on, broad, urbane, and unconcerned. To this day, all philosophic truth is Plato rightly divined; all philosophic error is Plato misunderstood. Out of this question respecting the particular and the universal, as moved by him, came the whole philosophy of the Alexandrian absolutists, the whole contentions of the Mediæval schoolmen. Around it all modern speculation gravitates. Even Psychology has laid her small finger on this gigantic theme, and vainly imagines that she has settled it for ever. But the wheel of controversy still moves round in darkness, and no explanation hitherto offered has sufficed to arrest the flying truth or to dispel the gloom. Realism, conceptualism, and nominalism have all been tried in vain; they are all equally at fault.†

93. Now it cannot be doubted, that in all speculative systems of philosophy the same fundamental truth is present, because it is not possible, in the nature of things, to be otherwise. But the truth may be developed and applied in the most varied modes; and throughout all systems whatever runs the great fundamental truth, that Mind is the final cause of order in creation. It is vari-

* *Institutes of Metaphysic*, p. 163.

† *Op. cit.* p. 165.

ously termed *Logos*, *Nous*, Reason, God, the Divine Idea, &c.; and its derivative powers as causes have had still more numerous names, according as they were examined by mysticism, philosophy, or science. It may be the *Fate* of the Atheist, the *God* of the Theist, the *Fetish* of the savage—still the same great truth can be traced through all.

94. The immense variety of opinions expressed by mankind in generalis due solely to that widely different experience of things which is a necessary result of the constitution of human nature; but the extreme differences of opinion amongst philosophers are due to vices of method. I have already examined this question, yet it will be of service to illustrate once more what appears to me to be the right method, by the example of a signal failure from the use of a wrong method. Plato's speculative philosophy is not unworthy of the admiration so generally accorded. He grasped very clearly some of the great truths of mental science, reaching them by the mere force of thought. And this is not only possible with such truths, for they are but the evolutions into knowledge of fundamental intuitions—nay, that method, rightly conducted, is the shortest way to attain to a knowledge of such truths. They are true *noumena*. But when the same method is adopted to attain to a knowledge of *phenomena*—*i.e.*, of events and successions dependent upon mind and its derivative ideas as causes—it sinks into a spurious teleology, of which the only result is a series of sterile hypotheses as to final causes (p. 111). Now, such was the method which Plato adopted in examining into the phenomena of creation, and in which he has been imitated by generation after generation of philosophical inquirers down to the present. He sought in thought, and thought alone, that which should have

been verified by, if not deduced from, observation. Hence his doctrine, given at length in the *Timæus*, of the relations of body and mind, and of biology in general, is purely hypothetical. It is in truth nothing better than a teleological superstition, which would discredit any modern European of ordinary intelligence. He represents the Deity as the artificer of divine natures; but first making the gods, he committed to them ("the junior gods) the charge of producing those that are mortal. The latter, in imitation of their father, receiving the immortal principle of the soul, next fashioned (formed as it were on a lathe) the mortal body, making it entirely to be a vehicle thereto," &c.* The method these "junior gods" followed is duly set forth: "First, then, the gods, in imitation of the spherical shape of the universe, bound the two divine circles of the soul in a spherical body—that, namely, which we now call 'the head,' which is man's most divine member, and the ruler of our whole composition."† Their immortal soul thus seated in the head—the *nous*, or reason—had three faculties: *noesis*, or intelligence; *episteme*, or knowledge; and *doxa alethes*, or intuitive truth. Subordinate to it, the "junior gods" formed a separate mortal kind of soul, possessed of certain dire and necessary passions,—"pleasure, pain—the desertion of what is good," fear, hope, and "all-daring love;" but "fearing to defile the Divine nature more than was absolutely necessary, they lodged man's mental portion separately from the Divine, in a different receptacle of the body;

* *Timæus*, chap. xliv.

† I quote from Mr Davis's Translation, published by Bohn. It is evident, however, that justice is not done to the language of Plato by the use of such a bald word as "composition," when the idea to be expressed is clearly that of organisation.

forming the head and heart, and placing the neck between, as an isthmus and limit to separate the two extremes." The mortal soul had two elements—the one male, *thumikon* (hence the anatomical term *thymus*, still in use); the other female, *epithumikon*. The male portion, which was conceived to partake of fortitude and spirit, and to love contention, was placed above the diaphragm; the female, which was conceived to be appetitive, was placed below. The heart was the source whence was transmitted along the veins the threatenings and exhortations of Reason (*i.e.* of the *nous*, seated in the head), in cases of outbursts of anger, caused by the thymic soul. The lungs were formed by the "junior gods," with the object of moderating the excessive heat of the heart, and to be "like a soft cushion" round it, "in order that, when anger rises in it to an extreme height, it might fall on some yielding substance, and so, getting cool, yield cheerfully and with less trouble to the authority of Reason." Such is an example of the biology and mental physiology of Plato. It must be conceded by his warmest admirers, that, however fully he reached to a knowledge of the "universal and absolute" Reason by the force of reason, his method wholly failed him in his search after a knowledge of the variable and contingent phenomena of Existence. It is but one of many similar instances which tend to establish the true principles of Method. A knowledge of the fundamental truths of reason—the *noumena*—and their relations to wide generalisations of phenomena (for these latter are the exponents of the former), *may* be evolved by laborious thought on the fundamental intuitions; but an intimate knowledge of the co-existences and successions of phenomena can only be reached by observation, comparison, generalisation—*i.e.*, the slow and laborious method of induction. This

is the natural order and method:—Intuitions first; *then* the teachings of Experience. But all our cognitions have the quality of unity; and hence the two sources of knowledge must combine into one mental act. "All knowledge," Kant remarks, "begins with intuition, proceeds from thence to conceptions, and ends with ideas. Although speculative reason possesses, in relation to all these elements, *à priori* sources of cognition, which seem to transcend the limits of all experience, a thorough-going criticism demonstrates that it can never, by the aid of these elements, pass the bounds of possible experience, and that the proper destination of this highest faculty of knowledge is to employ all methods, and all the principles of these methods, for the purpose of penetrating into the innermost secrets of Nature by *the aid of the principles of unity* (*among all kinds of which teleological unity is the highest*); while it ought not to attempt to soar above the sphere of experience, beyond which there lies nought for us but the void Inane."*

We will now proceed to examine, by the aid of this principle of teleological unity, "the innermost secrets of Nature," lying hid in the relations of Mind to the phenomena of Life and Thought, and develop the laws of Mind as the cause of all phenomena.

* *Kritik der Rein: Vernunft.* App. to Transcendental Dialectics, final paragraph.

PART III.

MENTAL DYNAMICS, OR TELEOLOGY.

The method we have laid down requires us now to develop the general principles of Teleology, or the general laws of Mind, considered as a force in creation operating to ends; and to develop them in such a way that the phenomena which the three great divisions of the sciences investigate—namely, the physical, the vital, and the mental—may be brought into teleological unity. Without this result we shall fail to attain our great object, which is to determine, scientifically, the relations of the vital forces to mind. Such laws will constitute the principles of what we have termed Mental Dynamics.

95. Our method is founded upon the fundamental *datum*, that there is an order of succession of the phenomena of creation in space and time, which man seeks to know and attain. The idea of succession in a given order necessarily implies the fundamental idea of causation. Experience assures us that Mind, and the so-called forces of matter, are equally causes of successions, coexistences, and the like; but we have already reached the fundamental truth, that Mind predominates over both the physical and vital forces, inasmuch as in relation to their phenomena it is the universal and necessary causal element. To comprehend clearly the relations of Mind and

Matter to the other forces and their phenomena, we must examine and correlate the generalisations of experience and science, as included under the three great departments which deal with Forces, Life, and Mind respectively, so as to determine the order of events, or the modes in which Mind is the cause of phenomena. This will require a subdivision of Mental Dynamics into three divisions. In the first we shall be able to correlate the causes of phenomena, and may therefore term it ETIOLOGY; in the second we shall develop causes in their relation with vital phenomena, so as to determine the general laws of Life, or the first principles of BIOLOGY; in the third we shall bring the general laws of Life into correlation with the general laws of Consciousness, and so establish the first principles of a SCIENTIFIC PSYCHOLOGY.

DIVISION I.

THE CORRELATIONS OF CAUSES, OR FIRST PRINCIPLES OF ETIOLOGY.

CHAPTER I.

GENERAL DOCTRINE OF THE CORRELATION OF CAUSES.

96. We have seen that the experience of mankind is founded upon generalisations of the uniformities of Nature (p. 92), which generalisations are also termed Laws of Nature. The term *law*, as commonly used, denotes the written or spoken words in which is expressed the will of any person or persons having the power to compel others to adapt their conduct to the will so expressed. Conduct so compelled, would be a succession of uniform events according to law.

97. In science, whenever a uniformity of successions of events, or of phenomena in Nature, is observed to have taken place, the expression in words or signs of that uniformity is also termed a law. Thus, it is a law of nature that air has weight, that the attraction of gravity is inversely proportional to the square of the distance, that all men die, and the like. Here the mind recognises a uniform order of events, and therewith conjoins the expression of that order, or *the law.* But as the order is logically a necessary order, so the law is logically a necessary law. And in this quality of necessity, or fixed uniformity, or invariableness, the mind recognises a resemblance between the order and the expression of that order; so that the law, as to the attributes of neces-

sity and invariableness, comes to represent to the mind the order, and to stand for it, in regard to those attributes, as the sign thereof. Thus, uniform unvarying order, and the law expressive thereof, are equally the invariable and the necessary. Now, these are the correlative qualities of the "universal" in Knowledge and Existence; they are therefore the qualities of the great forces of Nature, which maintain the unchangeable uniformities determined by observation and experience. *Force* is a word arising out of man's experience of this necessary order of events. He finds the fixed order to be an inevitable order. This inevitableness implies an irresistible power or force, as the cause of the inevitableness in the order. Those orders of events in Nature which are not inevitable, but variable, and contingent upon some other series of successions, are regulated by derivative, contingent, or secondary laws, and are dependent upon derivative, contingent, and varying forces. The highest illustration of this is to be found in the laws of human society. The supreme powers of the State are present in the judges, corporate authorities, magistrates, and all officers of the laws, as contingent or derivative powers executing fundamental laws as contingent and derivative laws, and which appear as decisions, bye-laws, and the like. All power and all law is derived from the Crown, as the "concrete *Ego*" of the State. When, therefore, we speak of the great laws of nature, we imply both a necessary or inevitable succession of events, and the cause of the succession, *i.e.*, a correlative power or force. Thus the terms "law" and "force" become synonymous, and stand for each other. In this way we speak convertibly of the law of gravity and the force of gravity; of the laws of life and the powers of life, or the vital forces; of the laws of chemical affinity and the force of affinity; and we say generally of any-

thing, that it has the force of law. The term "force" has nevertheless its own meaning, and contains a generalisation different from that of the word "law." In its strictest sense, *force* expresses that which compels to the course of events expressed in the word "law," without reference to the formula or order. In this way the term becomes a sign synonymous with the order of succession which it compels, just as the term "law" is synonymous with the order which it expresses; and so "law" and "force" are convertible terms, being equal to the same thing in expression—namely, a fixed order of events.

98. There are both universal forces and particular forces. The universal are those primary forces of matter which inevitably and unchangeably compel to the uniformities of succession expressed in the general laws of motion of matter, the chief of which is the law of gravitation. The particular forces are those which cause the apparent deviations from the general laws. But since the inevitable and necessary alone can control itself, all the phenomena which appear to be due to deviations from the primary laws and forces, are necessarily due to forces which are contingent, derivative, or secondary. These apparent deviations from the great laws and forces of nature constitute, in truth, none other than the phenomena of Nature, and, as such, are the sole objects of science. Science may therefore be defined to be a knowledge of these deviations from the great laws of nature formularised in contingent or derivative laws. Here again we meet with the union of the universal and the particular in the widest generalisation of the phenomena of creation, and can comprehend how it is that the sciences —that is, the orderly expression of cognitions or "knowledges"—all tend to centre upon a few generalisations, and these again to unity. An illustration of this point

will be useful. Man maintains himself in an erect position in opposition to the force of gravity, and contrary to the law of gravity. This he effects either by a volition or unconsciously. In either case, Mind is the universal element in the act, the vital forces the particular element. Now, if the whole series of events couldbe traced, so that the source of the power by which he resists the inevitable force of gravity could be laid bare, it is probable, from recent researches into the correlation of the physical and vital forces, that that source would be found to be in one of the great primary forces of matter; in other words, that the force exercised in muscles is correlative with the mechanico-chemical forces, or heat, light, electricity, chemical affinity, and the other primary molecular forces of matter; as these, again, are correlative with the primary force of matter—namely, of motion through space. Such, also, is the probable conclusion as to all manifestations of the vital forces.

99. Much ingenuity has been exercised in attempts to determine the cause of Life. Dr Whewell has well indicated how great a service would be rendered to physiology by the philosopher who should establish a precise, tenable, and consistent conception of life.* Inasmuch as the phenomena of consciousness are comprised under the same laws as the phenomena of life, and are due to the same causes, such a conception would be of equal service to metaphysics. But, as Mr Mill justly observes, such a conception can only be obtained from the phenomena of life itself; and inasmuch as the term itself indicates that the conception has been so obtained by mankind, it only remains to discover what is usually included under the term.

* *Philosophy of the Inductive Sciences*, vol. ii. p. 173.

100. Stahl and others have defined life teleologically—*i.e.*, according to its ends. Stahl said it was the preservation of the corruptible mixture of which our body is formed.* Cuvier and his followers define it as the faculty of resisting for a limited period the operation of the general laws of Nature, as manifested in inorganic matter, and of acting contrary to those laws; the terms "life" and "vital force" being used to designate these apparently exceptional instances of deviation from the fixed laws of Nature.† Here Cuvier recognised the defect in any definition of Life which set its laws in antagonism to the general laws of creation, inasmuch as unity of law and cause is a necessary element in any scientific definition of the order of any phenomena whatever. In another work he laid down incessant change as the main characteristic of life. Life, he said, is the property with which certain combinations of matter are endowed, of continuing for a certain time in a certain form, yet of incessantly assimilating to their constituent elements a portion of the surrounding substances, and of returning a portion of their substance back.‡ Bichat's definition is well known: Life is the sum of the functions which resist death.§ This was also substantially the definition of Lamarck: Life, he says, is that order and condition of things, in the portions of every body endowed with it, which render possible, or allow of, the performance of organic motion, and which, so long as they continue, effectually resist death.‖

* *Theoria Medica Vera—De Vitâ et Sanitate* (Leipsic edition, 1831), vol. i. pp. 228, *sqq.*

† *Anatomie Comp.* (1800), tom. i. pp. 1–2.

‡ *Règne Animale*, 2d edit. tom. i. p. 11.

§ *Sur la Vie et la Mort* (1800), p. 1.

‖ *Recherches sur l'Organisation des Corps Vivants* (Paris, 1802), p. 71.

100. M. Isidore Geoffroy St Hilaire has recently supplied an excellent summary of the various definitions of Life given by physiologists, in his philosophical work now in course of publication, to which I would refer the reader.* The fundamental principle in all is teleological —*i.e.*, recognises the end of the phenomena usually included under the term LIFE. Practically, it is a word which connotes the positive in antithesis to the negative; the existent in antithesis to the non-existent; living matter, in fact, in antithesis to dead matter. *Life* and *death*, *living* and *dead*, *organic* and *inorganic*, are therefore terms which mutually correlate and explain each other. Now, that is inorganic and dead which is inevitably subject to the primary forces of matter; such as the attraction of gravitation, light, heat, chemical affinity. On the contrary, that is organic and living which is only evitably subject to these forces. Rocks and stones increase by accretion, in virtue of a quality of matter in subordination to the force of gravity. It is that force which has made many rocks what they are. Others are what they are by the force of heat, acting as a force of repulsion. Plants increase in opposition to the force of gravity when they increase vertically upwards; and manifestly by some other force than the force of gravity when they increase horizontally, and downwards vertically, and by a force which can only be compared with that in virtue of which they grow upwards. It is only when the plant is dead that this force ceases to operate.

101. So also with the forces of matter generalised as chemical forces. The living matter resists these forces, so that the changes they induce in dead matter are not

* *Histoire Naturelle Générale*, tom. ii. (1858), pp. 72–102.

manifested so long as life continues. With death a purely chemical process commences, known as putrefaction, or decay; during life there is a continuous resistance to these processes. Hence Life is a resistance to the physical forces of matter—or in other words, consists in the exercise of special forces. We thus arrive at the conception that the phenomena which we term vital are manifestations of, and due to, certain forces, which we therefore term *vital*. And seeing the antagonism there is between the forces of living matter and of dead matter, we use language corresponding to this experience, and speak of the vital forces as opposed to the physical forces. These, therefore, correlate each other in cognition. Now, in this general cognition we detect a universal and a particular in correlation. For Life, as represented by vital forces, is the variable and contingent; whereas the great uniformities of Nature, being necessary, unchangeable, and inevitable uniformities, are due to forces equally necessary, unchangeable, and inevitable. Hence, in our cognition of Life, the physical forces correspond to the "universal," the vital forces to the "particular." But, then the "particular" are always derivatives of the "universal;" the antagonism, therefore, observable between the physical and vital forces is, as Cuvier sagaciously suspected, only apparent. The latter are, in fact, only another form of manifestation of the universal. We see that the physical forces themselves are but derivatives of another force, namely, that which orders all things to ends, and which is most particularly manifested in the phenomena of life, of which consciousness and thought are the highest evolutions (77). This is what is termed Mind. Mind is therefore the "universal" element in our cognition of both the physical and the vital forces, and consequently of all the known

forces of creation. In other words, mind is the universal, necessary, unchanging, causal element in all our cognitions of ourselves and of the universe; matter, as represented by the physical and vital forces, being the contingent, variable, ever-changing, causal element. Mind is the FIRST CAUSE; the one absolute thing, from which all other causes and things are derivative.

102. Our method, thus carried out to its logical conclusions, necessarily opens before us the widest possible field of inquiry into which the human mind can enter, inasmuch as it is co-extensive with creation. It imposes upon us the task of determining the correlations of Life and Consciousness, through the correlations of Mind with the physical and vital forces, as displayed in the unity of all created things. In furtherance of this task, it will be necessary to proceed step by step throughout the large generalisations which are needed for the completion of it; and commencing first with the correlations of the physical forces with each other, ascend thence to the correlations of the physical and vital forces, and finally to the correlations of these with Mind, as the final or ultimate cause to which we can reach.

CHAPTER II.

THE CORRELATIONS OF THE PHYSICAL FORCES.

103. Nothing is more conclusive as to the progress of modern science than the simplification of physical causes. Ignorance is the prolific mother of hypotheses as to causes, inasmuch as for every phenomenon it guesses a cause. As knowledge sheds its light amongst these, phantoms disappear or integrate, and thus gradually become fewer and fewer, until, finally, the ultimate change is reached, and the realities of light and order are manifested. Man's knowledge of the causes at work in nature have passed through these successive phases, so that forces which formerly were either only mystically apprehended, as magnetism, or speculatively apprehended, as heat and light, are now classed with each other, and with others the discovery of which constitutes the glory of modern science. No subject has been more constantly before the minds of thinking men in all ages than these agencies, and every variety of hypothesis has been invented to explain them. It is only of late years that experimental philosophy has given sufficient precision to our conceptions on the subject as to render them admissible into scientific works. Such, however, has been the progress of inquiry of late years, that Baron von Liebig has incorporated the doctrines of the convertibility of the physical forces into each other, or the *correlation* of these

forces, into the last edition of his *Familiar Letters on Chemistry* (ably translated by Dr Blyth of Cork).

104. Some of the experimental illustrations of the convertibility of forces into motion (and consequently of the indestructibility of force as to quantity), which Liebig quotes, are very interesting and conclusive. "It has been established experimentally, that 13,500 blows of a hammer weighing 10 pounds, falling on a bar of iron from a height of one foot, produce an amount of heat sufficient to raise one pound of water from the freezing point to that of ebullition. This fact may be represented in another way, by saying that 1350 cwts. of water, falling from a height of one foot, will raise the temperature of one pound of water from freezing to the boiling-point; or, in other words, that this amount of heat corresponds to a working-power capable of elevating $13\frac{1}{2}$ cwt. to the height of one foot."* It has also been found that the same amount of electricity which, when converted into heat by the resistance of the conductor, raises by one degree the temperature of one pound of water, generates a magnetic force capable of elevating a weight of $13\frac{1}{2}$ cwt. to the height of one foot. Again, it has been proved by careful experiments that the same amount of electricity will produce, by the decomposition of water, so much hydrogen as will, by its combustion, raise the temperature of one pound of water one degree.

105. In vital processes the same law is manifested. Without light and heat, plants do not grow; without heat, chemical affinity ceases, and animals perish. This correlation of the physical and vital forces is, in fact, a necessary deduction from the correlations of the physical forces with each other. Hence the force set free during the changes in the blood and tissues upon which the funda-

* *Op. cit.* p. 109.

mental phenomena of life depend, is convertible not only into motion, but also into heat, electricity, magnetism, and chemical affinity.

106. This doctrine of the correlation of the forces of organic and inorganic nature has had currency for a long period, although stated very variously. The influence of heat as a universal cause of phenomena seems to have been recognised long anterior to the era of the Greek philosophy, and as such to have been the cause of fire-worship at a period in the history of mankind incalculably distant from the present. The ancient Hindu philosophy teaches that "all that exist are united with fire, or Agnis, and all things that shall exist shall be thus also united." (*Rig Veda*, hymn lxviii. ver. 1.) "On thee, Agnis, depend all the collected firm works which the gods have raised." (*Ibid.* hymn xxxvi. ver. 5.) "The descendants of Bhriga worshipped thee (Agnis) for the sake of obtaining divine birth." (*Ibid.* hymn lviii. ver. 6.) The doctrine contained in the *Rig Veda* seems to be, that the Deity, or Soul of the Universe, is a fiery essence.* "The sun is the soul (*âtmâ*) of all that moves and rests," is a sententious aphorism of the Rig Veda.† Fire and Light—those fundamental physical agencies which seem necessary to all vital mechanism—were also considered the Divine elements of nature at an early period in the history of Greek philosophy. Hippocrates, in expressing not only his own sentiments, but those of Heraclitus and many of the Stoics, says, "It appears to me that what is called 'heat,' the elemental fire, is immortal and omniscient; that it sees, and hears, and knows all

* *An Introductory Treatise to Sanscrit Hagiographia*, by the Rev. W. Wrightson, A.B. (Dublin, 1859), p. 141.

† Professor Max Müller. *History of Ancient Sanskrit Literature* (1859), p. 20.

things, both present and to come."* In more recent times, Harvey attributed life to a *calidum innatum* present in the blood, totally different in its operations from ordinary heat, and analogous to the element of the stars—one example of many similar theories.

107. The advance of modern natural philosophy has constantly given a more definite character to these speculations, which received, however, their greatest impulse subsequently to the researches of Black into the nature of heat, and the application of heat to motor purposes by Watt. The inquiry was principally, in the first instance, as to the correlation of heat with what are termed the "living" forces (*vis viva*)—namely, elasticity, gravity, and the like, and of which the correlative is motion. As the laws of light, electricity, magnetism, chemical affinity, were more clearly determined, and their correlations discovered, the correlations of heat with these or some of them were also perceived, until at last the idea must have entered into the minds of most thinkers. Without putting forward any claim whatever to priority, I may be permitted to state, that so long ago as 1833 it occurred to me as a doctrine practically of value in the solution of the question of ocean locomotive navigation, then discussed. I indulged a hope for some time (and, in fact, instituted experimental researches), that galvanism and chemical affinity might be substituted for heat—not in the way lately attempted, but by decomposing water, and utilising its constituent gases in explosive mixtures. The close analogies between heat and light, too (always so manifest), have been ably developed experimentally by Professor J. D. Forbes, M. Melloni, Professor Powell, and others.

108. The attempts to correlate the physical forces made

* *De Princ. aut Carnibus*, § 1.

of late years are of three kinds, — the speculative or philosophical, the mathematical, and the experimental; they all date principally from the close of the last century, when the material theory of heat was questioned, and the dynamical theory advanced by various inquirers. To Count Rumford, and not to Sir H. Davy, is the merit mainly due of first showing experimentally the correlations of heat and motion. In a paper entitled, "On the Source of the Heat which is excited by Friction," read to the Royal Society of London on 25th January 1798, Count Rumford gave an account of numerous experiments he had caused to be made in the year preceding, at a cannon-foundry at Munich. Amongst other results of his researches he found, that the heat produced by boring a cannon made 18·77 pounds avoirdupois, or two and a quarter wine gallons, of water to boil in two and a half hours. "It would be difficult to describe," he says, "the surprise and astonishment expressed in the countenances of the bystanders, on seeing so large a quantity of cold water heated, and actually made to boil, without any fire."* Reasoning on these and other facts, Rumford concluded that the material theory of caloric was not satisfactory. "It is hardly necessary," he observed, "to add, that anything which any insulated body, or system of bodies, can continue to furnish *without limitation*, cannot possibly be a *material substance;* and it appears to me extremely difficult, if not quite impossible, to form any distinct idea of anything capable of being excited and communicated in the manner the heat was excited and communicated in these experiments, except it be MOTION." He estimated the equivalent to the horse's power which caused the friction, by comparing it with that produced by the combustion of wax, with the view

* *Phil. Trans.* vol. lxxxviii. p. 92.

of showing "how large a quantity of heat (it was equal to nine candles) might be produced by proper mechanical contrivance, merely by the strength of a horse, without either fire, light, combustion, or chemical decomposition."

109. In another paper read to the Royal Society 2d February 1804, Count Rumford gave the result of very numerous experiments on heat, and again maintained the theory that it was motion. "It seems probable," he says, "that *motion* is an essential quality of matter; and that rest is nowhere to be found in the universe."* And, in accordance with this grand generalisation, he proceeds to explain the phenomena of heat on the hypothesis that the constituent particles of bodies are ever in motion, according to the same laws which regulate the solar system; and that it is changes in the velocity of these movements which determine the phenomena of heat. In particular, he shows that, according to the undulatory theory, light and heat are closely analogous in their laws. "Judging from all the operations of nature," he remarks, with a hint as to the physiological application of his theory, "of the causes of which we are able to form any distinct ideas, we are certainly led to conclude, that the force of dead matter (*and perhaps of living matter also*), or its power of affecting, that is, of *moving* other matter, or of *resisting its impulse*, depends on its motion."†

110. Dr Beddoes states, in 1799, that long before he was acquainted with Count Rumford's experiments he "had expunged the matter of heat, or caloric, from his chemical system;" and that Sir H. Davy, who was then engaged at the Pneumatic Institution, made his experiments in ignorance of Rumford's.‡ Be this as it may,

* *Phil. Trans.* vol. xciv. p. 156. † *Op. cit.* p. 198.

‡ Thomas Beddoes, M.D. *Contributions to Physical and Medical Knowledge.* Bristol, 1799.

Sir H. Davy must have been developing his views nearly at the same time as Count Rumford, since he published them in 1799, as his first work, in the volume of essays just quoted, under the title of "An Essay on Heat, Light, and the Combinations of Light." In this essay he controverted not only the material theory of caloric, but went even further, and denied that light was related to heat. "Since light and heat are usually concomitant," he observes, "philosophers have questioned whether they are not cause and effect; and M. Lavoisier is one of these philosophers. He says: 'La lumiére, est elle une modification du calorique, ou bien le calorique, est il une modification de la lumiére?'* I have made an experiment which seems to demonstrate that light is not a modification of heat."† In fact, Davy believed light to be "matter of a peculiar kind," and "not a vibration of æther." Heat, however, he affirmed to be "probably a vibration of the corpuscles of bodies, tending to separate them. It may with propriety be termed repulsive motion."‡ He considered that bodies might have this repulsive motion increased in three ways—namely, "by the transmutation of mechanical into repulsive motion," that is, by friction or percussion; "by the motion of chemical combinations or decompositions;" and by "the communicated repulsive motion of bodies in apparent contact." The disposition in bodies to communicate or receive it is termed *temperature*. One of his experiments was the production of heat by the friction of two pieces of ice. It is remarkable that he omitted all notice of Count Rumford's conclusive experiments, although well known to him. Sir H. Davy gave to his views further coherency in 1812, and, still omitting all notice of Count Rumford's experi-

* *Traité Elementaire*, tom. i. p. 6.

† *An Essay on Heat*, &c., *op. cit.* p. 9. ‡ *Ib.* p. 21.

ments, again advocated the doctrine that heat is motion, in opposition to the theory that heat is caused by a subtle fluid, the matter of heat or caloric. His researches were at first principally intended to controvert a theory of Lavoisier and the French chemists, that gases were simple substances combined with the matter of caloric. Like Count Rumford, he admitted that it was easy to explain various phenomena by that theory, but others he showed could not be so accounted for,—such as the production of heat both by friction and *percussion*. Examining these phenomena, he drew the conclusion that "the immediate cause of the phenomena of heat is motion, and the laws of its communication are precisely the same as the laws of the communication of motion." He further inferred, "that the motion, if it exist, must be a vibratory or undulatory motion" (anticipating the more recent researches as to the analogies of heat and light), "or a motion of particles round their axes, or a motion of particles round each other." This latter, he conceived, was the state of fluids and elastic fluids, the particles of the elastic fluids moving with the greatest quickness; while "in æthereal substances the particles move round their own axes, and separate from each other, penetrating in right lines through space," &c.*

111. The relations of heat to the other mechanico-chemical forces,—namely, chemical affinity, electricity, galvanism or voltaic electricity, magnetism, and electro-magnetism,—have all been developed experimentally during the current century. In 1800, it was discovered by Nicholson and Carlisle that water was decomposed by the voltaic pile. In 1801, when Sir H. Davy was appointed lecturer to the Royal Institution (having already verified that important fact), he prosecuted his researches

* *Elements of Chemical Philosophy*, vol. i. p. 93, *sqq.* 1812.

in this new field of inquiry, and announced at last the foundation of his electro-chemical theory, that chemical and electrical phenomena are identical as to cause—*i.e.*, forces. The theory developed somewhat vaguely by Davy was completely established in 1833 by the progressive researches of Mr Faraday, who found that one grain of water required for its decomposition as much electricity as would make a powerful flash of lightning. In 1820, Oersted announced his discovery of the relations of electric and magnetic phenomena and forces; M. Ampère quickly followed with his establishment of the electro-dynamical theory; and finally, Mr Faraday, in 1833, discovered the laws of magneto-electric induction.

112. At this time, the conviction that a common cause, or force, operated in all these varied phenomena, had become very general; and definite attempts were made to demonstrate that unity of the physical forces which is implied in the idea. Two chemists, in especial, engaged at nearly the same time in researches to this end—namely, Mr Joule of Manchester, and M. Mayer. The first to publish his researches was Mr Joule, who demonstrated experimentally, in 1841, that the heat produced by a voltaic pair was proportionate to its electro-motive force for equal quantities of zinc oxidised.* In 1842, he showed that the heat produced by the combustion of an equivalent of a body is proportionate to the intensity of its affinity for oxygen. In 1843, he read at Cork, to the British Association for the Advancement of Science, a paper "On the Calorific Effects of Magneto-electricity, and on the Mechanical Value of Heat." This was published at length in the same year.† His conclusion was, that "the quantity

* *Philosophical Magazine*, vol. xxix. Oct. 1841; Paper dated March 1841.

† *Philosophical Magazine*, vol. xxiii. pp. 263, *sqq.*

of heat capable of increasing the temperature of a pound of water by one degree of Fahr. is equal to, and may be converted into, a mechanical force capable of raising 838 lbs. to the perpendicular height of one foot." Mr Joule also adds, that he has "proved experimentally that heat is evolved by the passage of water through narrow tubes."* In 1844, he experimented on the elasticity of gases, and proved that the heat in elastic fluids depended on the motion of their atoms;† and in 1845 and 1847, and later years, he resumed and continued his experiments on the friction of fluids, and the heat equivalent to motion thence derived.‡ M. Mayer states that he first determined experimentally the equivalent of heat and motor power at Sourabaya in 1840, and published the results of his inquiries in Wöhler and Liebig's *Annalen* for May 1842, in an article "On the Forces of Inorganic Nature." In this paper he defined forces to be things indestructible, transformable, and imponderable: he defined a weight lifted as force. The heat generated by the union of oxygen and hydrogen he attributed to motion; and he likened a locomotive-engine with its train to a distilling apparatus—the heat under the boiler being changed into motion of the train, and this showing itself as heat again in the heated axles of the wheels. He also showed that the descent of a column of mercury, compressing a gas or elastic fluid, is equivalent to the degree of heat resulting from the compression; and he concluded that the fall of a weight from the height of about 365 metres (*i.e.*, percussion) corresponded to the heat which would raise the same weight of water 1° Cent. M. Mayer subsequently (in 1845) developed his views

* *Op. cit.* pp. 441, 442.

† *Philosophical Magazine*, vol. xxvi. p. 369.

‡ *Philosophical Transactions* (1850).

experimentally, and gave them consistency in a theory of the correlation of forces. He demonstrated experimentally the conversion of motion into magnetism, and of this into heat. It is evident that both Mr Joule and M. Mayer worked originally in ignorance of each other's labours; and the merit of discovery, as to the equivalent of heat and motion, seems equally due to both, although priority of publication rests with Mr Joule.

113. The experiments of Joule and Mayer attracted much attention. In particular, Professor William Thompson confirmed, in 1843, those of Mr Joule. Mr Grove, however, set forth the correlations of the physical forces in the most systematic form, in a course of lectures which he delivered at the Royal Institution in 1843, and which were published in pamphlet form in 1846.* A third edition (extended to 229 pages, so rapidly had the subject advanced) was published in 1855. M. Seguin reproduced it in France, with additional facts. Since then, the doctrine has had various expositions.

114. The dynamical theory of heat, thus first developed experimentally by Count Rumford and Sir H. Davy, had its mathematical expositions by Carnot, Regnault, Chapeyron, Wm. Thompson, Clausius, Rankine, and others. Carnot published his mathematical theory of the motive power of heat in 1824.† His fundamental postulate is, that after a body has experienced a certain number of transformations, if it be brought identically to its primitive state as to density, temperature, and

* *On the Correlations of Physical Forces;* being the Substance of a Course of Lectures delivered in the London Institution in the year 1843. Lond. 1846. 8vo, pp. 52.

† *Reflexions sur la Puissance Motrice du Feu, et sur les Machines Propres à developer cette Puissance,* par S. Carnot.

molecular constitution, it must contain the same quantity of heat as that which it initially possessed; or, in other words, that the quantity of heat lost by the body under one set of operations is precisely compensated by that which is absorbed under others. This theory clearly contained the idea of the unity of the physical forces, and was the starting-point of a series of similar researches, continued up to the present time. Carnot's doctrines were discussed in 1834 by M. Chapeyron,* and by Professor Wm. Thompson in 1849,† in connection with the researches of Regnault on the same subject, published in 1847.‡ In 1851, Professor Thompson advanced the question still further, by a paper in which the general theory was discussed in its relations to Mr Joule's experimental researches.§ The researches of Clausius, published on this subject, were contemporary with those of Professor Thompson.‖ In the same year, Professor William Macquorn Rankine read a paper to the Royal Society of Edinburgh,¶ in which he developed mathematically the laws of the mechanical action of heat, especially in gases and vapours; he premised an examination of the hypothesis of mechanical vortices, and its applications to the theory of temperature, elasticity, and specific heat. At the close of the same year, Mr Rankine read another series of mathematical researches to the Royal Society of Edinburgh, founded on further

* *Journ. d'École Polytechnique*, vol. xiv. (1834).

† *Account of Carnot's Theory*, &c.; *Trans. of the Royal Society of Edinburgh*, vol. xvi. p. 541.

‡ *Memoires de l'Institut.* tom. xxi.

§ *On the Dynamical Theory of Heat; with Numerical Results deduced from Mr Joule's Equivalent of Heat*, &c.; *Trans. Royal Society of Edin.* vol. xx. p. 261.

‖ Published in *Poggendorf's Annalen*, 1850.

¶ *Trans.* vol. xx. p. 147.

experimental researches of Mr Joule, just then communicated to the Royal Society of London. More recently (September 1859), Professor J. C. Maxwell, of Aberdeen, laid before the British Association for the Advancement of Science, some illustrations of a dynamical theory of gases, founded on the hypothesis that they are constituted of particles of matter in rapid motion. Assuming these to be small, hard, and perfectly elastic spheres, acting on one another during impact, he demonstrated the laws of their motion with the view of applying those laws to the dynamics of gaseous matter. This assumption is equivalent to the hypothesis that the particles are centres of forces of which the action is insensible, except at a certain small distance, when it suddenly appears as a repulsive force of very great intensity. If the aggregate molecules which move together be supposed to have a bounding surface which is not spherical, then (Professor Maxwell thinks) the rotatory motion of the system will store up a certain proportion of the whole *vis viva*, as has been shown by Clausius; and in this way it is possible to account for the value of the specific heat being greater than on the more simple hypothesis.* It would be easy to add to the list of researches in this direction; but these few references will suffice to show how deeply modern research is imbued with the doctrine of the correlation of the physical forces, and how largely mathematical methods have been applied to the development of it.

115. The philosophical inquiries into the correlation of the physical forces vary much in their character; but although partly mathematical and partly experimental, they are essentially speculative. Newton had already perceived, and hypothetically indicated, the unity of these forces, when Boscovitch gave a systematic formula to the idea,

* *Lond. Edin. and Dublin. Phil. Mag.* (Jan. 1860), p. 20.

which has maintained its ground into modern times.* Concurrently with the recent advance of experimental philosophy, numerous attempts of a similar kind have been made to correlate the molecular forces of matter, and formularise the results of experimental research into a coherent system of physico-mechanical forces. Amongst the earliest and most complete attempts may be mentioned those of M. Poisson, a philosopher of France, who died too soon for his fame and for science. He applied mathematics to the elucidation of the dynamics of the physical forces. In 1828 he attempted to develop the laws of equilibrium of movement of elastic bodies in a Memoir read to the Academie des Sciences ;† and again, in 1830, in another on the propagation of motion through elastic media. In 1839, he communicated an interesting paper to the Academy‡ of a like character, in which he further developed his atomic views, and applied them to the determination of the mathematical laws of crystallisation, and to the force of crystals. Fundamentally, M. Poisson's doctrines are very similar to those of Mr Exley of Bristol, who was working at the same subject at the same time, although elaborated by a purer mathematical method. Mr Exley published, in 1829, a systematic exposition of the correlation of the force of gravity with all the molecular forces of matter, of a singularly able and comprehensive character.§ Mr Exley's work has not had that notice bestowed upon it by physicists which

* *Philosophiæ Naturalis Theoria*, &c. Venice, 1758.

† *Memoires de l'Academie*, tom. viii., x.

‡ *Op. cit.* tom. xviii.

§ *Principles of Natural Philosophy; or, a New Theory of Physics, founded on Gravitation, and applied in explaining the General Properties of Matter, the Phenomena of Chemistry, Electricity, Galvanism, Magnetism, and Electro-Magnetism.* By Thomas Exley, A.M. 8vo, 1829. Longman & Co.

it merits, Boscovitch's theory having in some degree already occupied the ground, although far inferior in extent and completeness to the Exleyian doctrine; nothing more complete has in fact been published since. So far as I know, the only theory which exceeds it, in comprehensiveness rather than in applicability, is the recent production of an American theologian.* In this system of the universe the leading idea is Platonic; but the forces of matter are reduced to two mutually opposing forces, as in the great majority of systems of this kind. Dr Hickok first lays down *à priori* principles, commencing with matter considered as substantial resistance, and proceeds thence forward to the first laws of motion and their derivative laws, and so on to the principles of Gravity, Magnetism, Electricity, Heat, Chemical Action, and Crystallisation. He is not content, however, like Mr Exley and others, with the application of his principles to terrestrial forces and laws, but, on the one hand, brings under the same general laws the formation of worlds and their distribution as stellar masses in space, and on the other the development of vegetative, animal, and human life. The cosmical and physical speculations of Dr Hickok are remarkable for their simplicity and boldness; the organismic betray an inherent insufficiency and weakness. The Rev. Dr Macvicar of Moffat has just published a small work of deep thought, in which he attempts to reduce the phenomena of nature to unity.† Starting from a fundamental law of Being, which he designates the "Law of Assimilation," and which is dynamical in

* *Rational Cosmology, or the Eternal Principles and the Necessary Laws of the Universe*, by Laurens P. Hickok, D.D., Union College, New York (1858).

† *The First Lines of Science simplified, and the Structure of Molecules attempted.* Edinburgh, 1860.

its form or character, he gradually evolves the laws of *Inertia*, gravitation, elasticity, and symmetry. A theory of "the ultimate atom," or primary atomic sphere, is also deduced from the same law, and from this the principles of a definite system of atomic philosophy developed. The laws of composition of bodies, both organic and inorganic; the development of matter from the simple to the complex forms; and the laws of chemical equivalents, of crystallography, and of morphology generally, are evolved from these principles. Numerous woodcuts assist to explain the text, and present to the eye a singular variety of beautiful geometrical forms, both simple and complex, developed out of the dynamics of the theory. This comprises equally the atomic constitution of vapour and silicon, and the morphology of snow-flakes and sulphur-molecules. The fundamental idea of Dr Macvicar's system is teleological.

116. Very recently, renewed attempts, showing great power of thought, have been made in this country, to develop a mathematical theory of physical forces. In particular, Professor Challis of Cambridge, in a paper lately published,* has brought forward a mathematical theory of attractive forces, and a theory of the force of gravity, founded on the Newtonian hypothesis, that the constituent particles or atoms of matter are hard, impenetrable, inert, and capable of movement; with the addition, by Professor Challis, that they are spherical, and acted upon by the pressure of a highly elastic medium, pervading all space, but the operation of which only becomes perceptible when, from any cause, it is made to press unequally on opposite hemispherical surfaces of the atoms. This hypothesis is in accordance with what Mr

* *The London, Edinburgh, and Dublin Phil. Magazine*, Nov. and Dec. 1859.

Faraday denominates "the conservation of forces." In the number of the same journal for February of this year (1860), Professor Challis has also developed a theory of molecular forces, which, he thinks, differs from the others as to the character of its primary *datum*, inasmuch as it admits of no other kind of action than the pressure of a very elastic fluid medium (the æther), and of no law of force which is not a mathematical deduction, by means of hydrodynamical equations, from the assumed dynamical property of the medium—namely, that its pressure is proportionate to its density.

117. A doctrine of the conservation of force has arisen out of the doctrine of the convertibility of the forces into each other. As the opinion has gained ground that force can be neither created nor destroyed, inquiries have been made as to the distribution of force under certain conditions, or how it is conserved. Amongst the philosophers who have discussed this question may be mentioned M. Helmhotz* and Mr Faraday.† These speculations have served to raise doubts as to the accuracy of the current theories of the physical forces, and to suggest new objects and methods of experimental research. Mr Faraday, in particular, has thus been led to question the validity of the notions current as to the force of gravity, and to inquire what becomes of the force when one body recedes from another, seeing that the force of attraction varies inversely as the square of the distance. Such being the fact, it follows, according to the law of the conservation of force, that some other exertion of power, hitherto unknown, must be proportionately growing up, either within or without bodies.‡ Mr Faraday's ingenious speculations

* "On the Conservation of Force;" *Taylor's Scient. Memoirs*, 1853.

† "On the Conservation of Force;" *Phil. Mag.* vol. xiii., 1857.

‡ *Op. cit.* p. 231.

have been controverted by Dr Brücke, Professor of Physiology in the University of Vienna.*

118. With reference to these various speculations it may be observed generally, that they rather profess to explain the concatenation of known phenomena than to demonstrate new relations. They rather show, as to the unknown, what may or can be known, than exhibit what has been worked out under the guidance of the principles or theories; differing, therefore, in this respect, from those numerous speculators who have been rather anxious to discover new facts—*i.e.*, phenomena in new relations—by the aid of speculative views applied to experimental research. What is to be noted generally is this, that an explanation of the relations of these forces to matter involves an admission of the Atomic Theory, one of the most ancient of physical hypotheses—according to which all bodies consist of exceedingly minute particles, placed at certain distances from each other, so that there is free space around each particle. They are, physically, indivisible units, or, in other words, are incapable of further division without destruction, and are therefore termed atomic, or atoms. Nevertheless, the atomic particle is conceivably made up of smaller particles; only it cannot be separated into its ultimate elements without ceasing to be. Now it is on these atoms, or physical units, that the physical forces act,—causing them to move, to adhere to each other, to repel each other, and the like, according to certain laws. The fundamental law of their forces, long since recognised by Laplace and Berthollet, is the fundamental law of mechanics—namely, that an atom or molecule, put in motion by any power whatever, may communicate its own motion to another atom in contact

* "On Gravitation and the Conservation of Force," *Phil. Mag.* vol. xv. (Feb. 1858.)

with it. "This law," Baron Liebig remarks, "has only recently been recognised as a cause of the alterations in the forms and properties which occur in our chemical combinations; and its establishment is the greatest and most enduring acquisition which chemical science has derived from the study of fermentation."* The nature of the motions between the atoms are represented variously by various theories; but two primary ideas represent the two principal classes of theories, which may be termed the linear and the spherical. According to the linear hypothesis, the motion is from atom to atom, as ideally represented in line; according to the spherical, as ideally, though complexly, represented in spheres. The linear idea was chiefly adopted, in the first instance, to explain the phenomena of electric attractions and repulsions, but was subsequently applied to the correlative phenomena of chemical affinity, magnetism, and light and heat. The spherical idea does not necessarily rest on the Newtonian theory of solid atoms, although it does not reject it. Thus Boscovitch's theory was founded on the substitution of mathematical centres or spheres of force, for solid atoms—these being surrounded by alternate spheres of attraction and repulsion. Mr Exley simplified this theory, and started from the fundamental principle that each atom of matter consists of an indefinitely extensive sphere of attraction, resting on a very small concentric sphere of repulsion—the force being everywhere, from the centre inversely, as the square of the distance; repulsive near the centre, and then attractive. The solid atom is combined with spheres of force in the late Dr Samuel Brown's hypothesis of chemical forces. According to this hypothesis, a particle or atom is a mole-

* *Familiar Letters on Chemistry*, edited by Dr Blyth, p. 231.

cular *nucleus*, surrounded by five spheres of force alternately repulsive and attractive—R, *a*, R′, *a′*, R″. The first force, R, is never overpassed in the procedure of nature; the second, *a*, is the sphere of chemical affinity; the third, R′, is the force which hinders the compression of a solid body beyond a given point; *a′* is the force of cohesion; "and that of R″ is 'the sphere of gasiformation; repulsion, liquiformity, lying in the mesoteric line of the two last."* The theory of physical forces of Dr Hickok offers very similar general features to the others. The attractive and repulsive forces he designates the diremptive and antagonistic molecular forces. These work against each other within certain primary limits. "The pure forces," he observes, "in their contact in the simple limit, may be known as units under the term of *molecules*, or molecular forces; the working to the limit constituting an antagonist molecular force, and the working away from the limit constituting a diremptive molecular force. The combination of these forces, in their joint interaction making a new compound, as a third thing unlike to either alone, may be known also as a unit, constituting a material *atom*, and which may be further known as a *chemical* atom or molecule. Our conception of matter must therefore be of this combination of distinguishable forces, though we shall find it convenient for the more clear apprehension of the principles of the universe, to follow out the workings of each distinctly and separately."†

119. Although I have mentioned one or two of the more consistent atomic theories, it is to be observed that the agreement of these with each other is of no import-

* *Lectures and Essays*, by Samuel Brown (1858), vol. i. pp. 64–69, note.

† *Rational Cosmology*, p. 96.

ance for the present purpose, which is merely to demonstrate the unity of the ideas upon which they are founded. A new atomic theory was, however, introduced to the notice of the Royal Society of Edinburgh, on 18th February 1867, by Professor Sir W. Thomson, which dispenses with the Lucretian atom. It is founded on Helmholtz's discovery of the law of vortex motion in a perfect liquid (*i.e.*, without viscosity or fluid friction).* It is only needed to assume that these "vortex atoms" possess inertia and incompressible occupation of space, and the hypothesis will serve to explain the elasticity of gases, and the varieties and allotropies of known simple bodies and their natural affinities. The hypothesis is, that elementary bodies and molecules are constituted of these vortex atoms in the form of elastic rings, bound together either as duads (the atom of sodium, for example, consists of two rings), or more complexly, and rotating according to harmonic ratios. It is interesting to notice, in reference to the physiology of hearing and vision, and the influence of light on the retina and auditory nerve, that Professor Stokes' dynamical theory of spectrum analysis equally implies that the ultimate constitution of simple bodies must include one or more fundamental periods of vibration, as has a stringed instrument of one or more strings, or an elastic solid, consisting of one or more tuning-forks, rigidly connected. The hypothesis as to harmonic vibrations is directly applicable to the theory of the Ideal in form, colour, and sound, promulgated by my late friend, D. R. Hay, which refers it to purely harmonic ratios of vibrations received from bodies giving off sound, or reflecting light. (See vol. ii. sect. 505.)

* *Proceedings of the Society* (1866-67), No. 73, p. 94.

CHAPTER III.

CORRELATIONS OF THE PHYSICAL AND VITAL FORCES.

120. The correlations of the physical and vital forces have not escaped the attention of philosophers. The obviously close dependence of all life, whether animal or vegetable, upon heat and light, led to the earliest theories of cosmogony and generation, and to a widespread form of worship in the East—the worship of fire and of the sun. Such a principle could hardly have escaped the acute intellect of the ancient Greek physiologists. Thus Aristotle remarks that though some were of opinion that fire was the cause of nutrition and growth in animals, it was only a correlative, or con-cause—*συναίτιόν πως*—co-operative with the *psyche*.* And elsewhere he remarks: "Neither is digestion of food (*pepsis*), by which nutrition is effected in animals, done without the *psyche*, nor without heat, for all things are done by fire."† Hypotheses were abundantly formed as modern physical science advanced, until the discoveries of Galvani and Volta turned the attention of physiologists almost exclusively to the correlations of electricity and galvanism with the *vis nervosa* or nerve-force. It is sufficient to mention the names of Matteucci, Du Bois Raymond, Helmholtz, and Claude Bernard, to indicate how fertile this discovery has been in extending our knowledge of the relations which vital phenomena bear to the physical forces.

* *De Anima*, lib. ii. † *De Resp.* cap. vii.

121. Although the idea of a correlation between the vital and physical forces in general must have occurred to many, if not most thinkers on the subject, Dr Whewell seems first to have definitely expressed it in modern times. "Life," he observed, in 1840, "is a system of Vital Forces; and the conception of such forces involves a fundamental idea. Mechanical, chemical, and vital forces form an ascending progression. Chemical Affinity includes in its nature Mechanical Force, and may often be practically resolved into mechanical force. (Thus, the ingredients of gunpowder, liberated from their chemical union, exert great mechanical force: a galvanic battery, acting by chemical process, does the like.) Vital Forces include in their nature both Chemical Affinities and Mechanical Forces; for vital powers produce both chemical changes (as digestion) and motions which imply considerable mechanical forces (as the motion of the sap and the blood.)* In 1846, when Mr Grove published his views on the "Correlation of Physical Forces," he also expressed an opinion that his "principles and modes of reasoning might be applied to the organic as well as the inorganic world; and that muscular force, animal and vegetable heat, &c., might, and at some time will, be found to have similar definite correlations." The merit, however, of having first distinctly formularised the doctrine, and indicated experimentally the forces which are convertible into each other, appears to rest with M. Mayer; to whose labours, in developing the theory of the correlation of the physical forces, I have just referred (112). Those views were first published in 1845. In this essay M. Mayer applied his theory of the physical forces to vital phenomena. He arranged synopti-

* "Aphorisms concerning Ideas," *Philosophy of the Inductive Sciences* (1840), vol. i p. xxxiv.

cally the principal forms of the forces which are convertible into each other, as follows:—1. and 2. Motion (*vis viva*); 3. Heat; 4. Magnetism, Electricity, Galvanism; and 5. Chemical Force. The blood, according to his views, is a fluid which burns slowly when submitted to the action of the walls of the capillaries, the result of the process being animal heat and motion.* In September 1849, my late venerable friend, Dr Fowler of Salisbury (who, at the close of the last century, introduced the physiological researches of Galvani to the British cultivators of science), read a paper to the British Association for the Advancement of Science, which was an answer to the question, "If Vitality be a Force having Correlations with the Physical Forces?" Next, Dr Carpenter gave a more elaborate exposition of the doctrine, in 1850, in his able paper "On the Mutual Relations of the Vital and Physical Forces," read to the Royal Society of London, and published in the *Philosophical Transactions*. More recently, and impressed especially with the doctrines which Dr Carpenter stated in his paper, Professor Joseph Le Conte, of South Carolina College, Columbia, has attempted to show more particularly the relations of the chemical forces to the forces operative in the vital phenomena—a subject as fertile in suggestions and hypotheses as the correlations of the physical forces.† Various other attempts in this direction might be mentioned in this list of hypothetical researches after the relations which material and vital

* Compare *Comptes Rendus*, vol. xxvii. p. 385.

† *The Correlation of Physical, Chemical, and Vital Forces, and the Conservation of Force in Vital Phenomena*, by Jos. Le Conte, Professor of Geology and Chemistry, &c. *Silliman's American Journal*, Nov. 1859; and *Lond. Edin. and Dublin Philosophical Magazine*, Feb. 1860.

forces bear to each other, some of a highly mystic character. I need not, however, enter upon the history of these, as my object is not to write the history of this branch of scientific research, but simply to show that the doctrine of the correlations of the forces of nature is founded upon the solid basis of observation and physical and mathematical research, and is therefore a true scientific generalisation.

122. It is to be noted, however, that although so much has been done to elucidate the unity of operation of the forces of nature, nothing has been achieved teleologically in explaining how they are applied to ends. It is a doctrine as old as the hills, that Mind is the first cause of motion. The proposition of Anaxogaras, Νουν μεν αρχην κινησεὼς, has been re-echoed by all metaphysicians of modern times. It is an equally ancient doctrine that motion and change are the cause of all the phenomena of creation—*i. e.*, change of relation of things in space and time. In the modern doctrine of the correlation of the physical forces, the unifying idea is (118–119) that they are all convertible into motion, and that they are simply manifestations of the different relations to each other in which atoms are placed. But there has been no teleological development of the doctrine, in its application to Life and Thought. Force has been simply personified according to the ancient and vulgar plan. An illustration is given in the following passage from an able paper on this head :—"Starting with the abstract notion of Force as emanating from the Divine Will, we might say, that this force, operating through inorganic matter, manifests itself in electricity, magnetism, light, heat, chemical affinity, and mechanical motion ; but that, when directed through organised structures, it effects the operation of growth, development, chemico-vital trans-

formation, and the like; and is further metamorphosed through the instrumentality of the structures thus generated into nervous agencies and muscular power."* Here the hypotheses are numerous:—1. Force emanates from the Divine Will; 2. Operates in matter, and "*manifests itself*" as electricity, &c.; 3. Is "*directed*" through organised structures. How the organised structures first arise, and who or what directs the force, is left in doubt; but since the force manifests itself, it may be inferred that it *directs* itself through organised structures. 4. But however directed, it also "*generates*" organised structures through the operations of growth, development, &c., in the organised structures through which it directs itself, or is directed. 5. And, finally, it is "*metamorphosed*" or changed, by the structures it thus generates, into nervous agency and muscular power. As the latter it is force again, or rather motion.

123. It is hardly necessary to discuss this discordant series of hypotheses seriously; perhaps they are not very seriously propounded. But, for our purpose, it is worth while inquiring what directs the force in its final evolution as "nervous agency" and "muscular power?" for in living conscious organisms these things act to ends. We find no intelligible answer in the hypotheses. According to the subjoined passage, the able author appears to think that there are two sources of adapting cause, the Will of God, and the Will of created sentient beings; and one might conclude from thence, that the "nervous agency and muscular power" are the result of the metamorphoses of their adapting Will-force. This idea is, however, negatived by the whole chain of hypotheses, and by the following statement:—"Believing, as the

* Dr Carpenter, "On the Mutual Relations of the Vital and Physical Forces," *Phil. Trans.* 1850, p. 752.

author himself does, that all force which does not emanate from the will of created sentient beings, directly and immediately proceeds from the will of the omnipotent and omniscient Creator, which is evidently the idea entertained by Locke;* and looking, therefore, at what we are accustomed to call the physical forces as so many *modi operandi* of one and the same agency, the creative and sustaining Will of the Deity, he does not feel the validity of the objections which have been raised by some to whose opinions on philosophical questions he attaches great weight, against the idea of the absolute metamorphoses or conversion of forces.†

124. Considered philosophically, the teleology of these hypotheses of the vital and physical forces is not that which modern science should afford us. It is simply in another form, that of Plato's physiology, with its "junior Gods" (p. 214). The force "emanating" from the Divine Nature as the source of all Power, and Life, and Thought, is represented as diffusing itself into matter through a thousand channels, as manifesting and directing itself, as operating, constructing, effecting, and at last as disappearing in a nerve-and-muscle metempsychosis, to reappear as adapted motion. On the other hand, created sentient beings, necessarily derivatives, like the junior gods of the Divine Being, are represented as having their own will-force. This force, like that of the Supreme Will, is represented as meandering into nerves, cells, and muscles; and like it, too, as building up, guiding, controlling, directing to ends.

125. That such are the conclusions at which all thinkers have arrived in all ages, as to operating of a directing and controlling force throughout creation, is very cer-

* *Human Understanding*, book ii. chap. xxi. "On Power," § 4.

† *Op. cit.* p. 730.

tain; and that from this point of view the idea is a true idea, must be admitted. What modern philosophy needs is a scientific exposition of the order of events and the successions of phenomena, as dependent on Mind, in correlation with the great forces of nature. This exposition must start from the fundamental facts wholly ignored in these speculative inquiries.

126. Here, then, is the central point of inquiry; for since the human organism itself is built up and rendered fit for the acquisition of a knowledge of these physical and vital forces, in their correlations, by the operation of these forces, the question to determine is, what are the correlations of the laws of design, as derivative laws of the Supreme Designer, with those fundamental intuitions, energies, and processes of thought (the result of the operation of vital forces) by which we attain to a knowledge of these laws? To determine this, we must first ascertain the general correlations of the physical, vital, and mental forces.

CHAPTER IV.

CORRELATIONS OF THE PHYSICAL, VITAL, AND MENTAL FORCES.

127. In proceeding to answer the question propounded at the close of the last chapter, and to examine the correlations of the forces of inorganic and organic matter with the adapting force—namely, mental power—it is clear, from the foregoing considerations, that we must start with the simplest possible conception of what conscient mind is. Man feels and energises, knows and acts. These are his fundamental mental powers. Now, when he acts consciously, he knows that he acts designedly; that is, to an end. His action is through his muscles, and is upon matter—is the communication of motion to matter, according to the fundamental law of the action of the physical forces just stated (119). But further, it is the general teleological law of all his motions, and, it may be added, of those of all organisms, to be adapted to ends; or, in other words, a law of design correlates the laws of operation of the vital forces. This point we have already examined fully, and have demonstrated the law (p. 107). The question arises, however, whether a law of design, with its corresponding force, is universally operative, and therefore correlative, with all the forces of matter whatever.

128. Let us begin this inquiry with the intuitions and unformularised experience of mankind as expressed in language. And, *firstly*, we find that the whole doctrine

of the forces of creation depends upon the intuition of them as causes. They can be thought upon as nothing else. Hence the correlation of these physical forces with mind. The union of the particular with the universal in the concrete *Ego* is manifest in the daily business of life, and expressed in the general terms of language. Man exercises what he calls power when he communicates motion, *i.e.* applies force to bodies; but that conscious exercise of power is eminently an act of the will—a mental act. It is *the* will. When exercised consciously, a resistance to the act of energy is usually experienced; and inasmuch as that which moves and that which resists the effect are found by experience to be identical, they both take the name of *vis*, or force. Now, the force man exercises over external things is found to be seated in his muscles. Accordingly, *power* and *muscular power* are almost synonymous. This was an early notion. The original meaning of the Greek word for force, Ϝίς (Latin *vis*) is the same as the more modern word for muscle or tendon (ἶς), with the digamma instead of the aspirate; and one of its earliest applications as an abstract term was to muscular power. Thus Homer,—

> "Then Ajax a far heavier stone upheaved;
> He whirled it, and impressing Ϝίς intense
> Upon the mass, dismist it."

Homer also speaks of the Ϝῖς of a river, and Hesiod of the Ϝῖς of the north wind.* And now, in modern times, the *vis*, or force, which moves the heavenly bodies through space is found to be identical in its character with the *vis* of the winds, the waves, and the living muscles.

129. Nor is this the only illustration of this kind. In

* Dr Whewell. *History of Scientific Ideas* (3d edit. 1858), vol. i. p. 206.

applying the force seated in his muscles, man aims at ends to be attained by that application of force; and the attainment of those ends is the business of his life. Hence the Greeks used the term βιος to express the life of man in the sense of active pursuit of objects; and in this sense it enters into the word *biography*, which is a history of the active pursuits of an individual during the period of his existence. The word βιος is a derivative of Fις, B often taking the place of the digamma in Greek. In the Latin term *vi-ta*, the digamma takes the more cognate sound of *v*. Hence the word βιον, a bow, as the primordial instrument of applying force to obtaining a subsistence, or maintaining continuous life.

130. The use of force to ends being thus the characteristic of Mind as known to us, and order being implied in the attainment of ends, the term Mind is used to designate the force which maintains order. Hence Sir Isaac Newton recognised mind in both planetary and vital phenomena, because of the uniform order in which they occurred: "Tam miram uniformitatem in planetarum systemate, necessario fatendum est intelligentia et consilio fuisse effectam! Idemque dici possit de uniformitate illa quæ est in corporibus animalium. Habent videlicet animalia pleraque omnia bina latera, dextrum et sinistrum forma consimili,"* &c. Mind and its synonyms thus express both force simply, as the physical cause of the orderly sequence of phenomena, and the directing and adapting force. *Mens* (Latin) is derived from the Greek μένος, which means both *vis* and the meaning specially implied in *mens;* and in this sense the latter word was sometimes used. "Deorum mente ac ratione omnis mundus administratur," says Cicero, distinguishing between Reason, the ordering power, and

* *Optices* (1719), p. 411.

mens, the force applied. It is to be noted, too, that *men*, used as a terminal in Latin, often corresponds in meaning to τελος in Greek (p. 109), and indicates a fixed order, an unvarying, certain succession of mental origin,—as Regi*ment*, Govern*ment*, existing by a fixed rule of conduct. Hence Regi*men*, Monu*men*tum, a fixed teaching or monition. In Greek, μεν, used as a conjunctive, and also alone, means *certè*, *profecto*—certainly, completely. The verb μενω, root of *maneo*, signifies to be present permanently, to exist predominantly, *superstes sum*; to look for an end. From μενω probably comes μναόμαι, and from this *memini* and its derivatives, as Memory. Mind (*gemynd*, Anglo-Saxon; *mein-en*, German, and its derivatives, as *meaning*—Anglo-Saxon, *mœn-an*) indicates "that which feels, which thinks, which has the power of beginning motion."*

131. Further, in looking round him, man intuitively recognises everywhere in creation the operation of a power like his own mind. Hence, with an imperfect knowledge of the order of events, he is apt to apply the same method of reasoning to natural phenomena as to his own actions, and so to infer that a conscious intelligent agent is present as a cause. In this way, in all ages and amongst all nations, Mind, as the unseen cause, has been individualised; and imaginary deities, demigods, and supernatural beings or agents, have peopled the earth, air, and ocean. With a more perfect knowledge of the order of nature, he brings his ideas into unity, and refers all the orderly adapted succession of events in creation to a Supreme Intelligence, as the original Cause of all things. And in speculating further upon the nature of this Great Cause, man can only con-

* D. Stewart. *Philosophy of the Human Mind*, 2d edit. vol. i. p. 401.

ceive it as a force in operation to ends. "Though it be true," says Cudworth, "that the works of nature are dispensed by a Divine law and command, yet this is not to be understood in a vulgar sense, as if they were all effected by the mere force of a verbal law or outward command, because inanimate things are not commandable nor governable by such a law; and therefore, besides the Divine will and pleasure, there must needs be some other agent and executioner provided for the producing of every effect, since not so much as a stone or other heavy body could at any time fall downward merely by the force of a verbal law, without any other efficient cause. . . . Wherefore the Divine law and command, by which the things of nature are administered, must be conceived to be the real appointment of some energetic, effectual, and operative cause for the production of every effect."* Speculations have varied as to the mode in which the Creating Mind operates in or upon creation; but the most generally received and the most philosophical doctrine is that which teaches that God impressed motion, in the first instance, on matter. Thus Descartes, in one of his letters to Dr Henry More, writes, "That transference [*translatio*], which I call Motion, is a thing of not less real existence than is figure; for it is a mode in body [*modus in corpore*]. The Moving Power, however, may be of God himself, maintaining that transference in matter as He fixed it at the moment of its creation, or belong to a created substance, as our mind or any other thing to which He gave the power of moving body; and, indeed, that power in a created substance is its mode, but not in God."† Dr Grew speculated to the

* *The True Intellectual System of the Universe*, book i. chap. iii. § xxxvii. 2.

† *Epistolæ*, 72, tom. i.

same effect as to the cause of life: "Yet neither by Life, nor the subject of it, do I mean a principle of motion—the universal state of motion, as that of matter, being neither increased nor diminished, but only transferred; but I mean a certain power to *determine the manner of its being transferred*,"* &c. Here the modern law of phenomena, deduced from the correlation of the physical forces—namely, the transference of motion—is explicitly laid down; but Grew, in advance of Descartes and modern physicists, adds the teleological element to his conception of Life—namely, a *definite manner* of transference, that is, to ends.

132. As a question of scientific research, design may be fairly inferred from the motor phenomena of creation.†

* *Cosmologia Sacra* (Lond. 1695), p. 62.

† Thus Lord Brougham states: "The fact of the heavenly bodies which form our system all moving in the same direction of revolution, is deserving of the deepest attention, when we consider that it leads to the most important result of the stability of the system; and that it is one of innumerable arrangements which might have been made, and none of which could have led to this result. In any other case, equal roots, or imaginary roots, or both, must have found their way into the equation from which the law of stability is deduced (Laplace, *Mec. Cel.*, lib. ii. c. 7, §§ 55, 57, and liv. xv. c. 1). Now, the same profound geometrician has shown, in another work, by the calculus of probabilities, that it is above four millions to one in favour of the forty-three motions from west to east (including rotation as well as revolution, and the motions of the sun and of the rings as well as of the planets and satellites) having been directed by one Original or First Cause; and by the same calculus he has shown the probability of the sun's rising again on the morrow of any given day, to be not much more than 1,800,000 to one; or in other words, that this event is above two million times less probable than the truth of the proposition that the motions in our system were designed by one First Cause."—*Paley's Natural Theology*, with Illustrative Notes by Lord Brougham and Sir Charles Bell (1836), vol. ii. p. 101.

Nor, if we examine the great empirical law of uniform and continuous succession, can we come to any other conclusion than that a law of design is the higher generalisation of the great uniformities of creation. Geology tells us that, in a time so long past that the imagination utterly fails to form any idea of the interval, the waves rippled upon a sandy shore, and the raindrops fell precisely as they do now under like circumstances. If the great uniformities of nature were not in definite relation to each other—if there were not fixed laws for the transference of force—this might have only happened for a day, and never more; for without such definite relation there could be no certainty of the recurrence of the phenomena. Yet it seems probable they have never ceased during the whole of an immeasurable lapse of time. Now the relation of uniform events, or of moving things to each other, so that there shall be a constant recurrence of the same phenomena, is an orderly succession of events, and implies adaptation, or a fitting of the events or things to each other, and therefore design. If there were no such order, there would be no uniformities. Hence it follows, as a logical necessity, that a law of design comprises all those fixed unvarying successions of events which we attribute to the physical forces.

133. The same argument is deducible from the œonic succession of organisms. Geology has made it clear that, concurrently with this demonstrable adaptation of the great masses of creation to each other as moving things, there have been many successive series of living things, all existing in adaptation to the external conditions which arise out of the operation of the great laws of nature. And although scientific inquirers are not agreed as to the teleological interpretation to be put upon the great phenomena of life and organisation, yet they strongly prove

the operation of a great law of design. To this conclusion we must necessarily come, if we grant that the great laws of nature and their forces, as manifested in the planetary movements, are derivative of a law of design; for it is logically necessary that the derivative forces shall include the characteristics of the primary, and consequently that the vital and chemical forces should be also subordinate to a law of design. Amongst the most recent upholders of this doctrine is M. Agassiz, who has deduced from it some new principles of zoological classification. He maintains the unity of design, as a rigorous conclusion from the facts. This he reaches by omitting the simpler relations of organised beings to the world around, or those of individuals to individuals, and considering only the great types as to their structural complications in past geological ages, or in successive phases of their growth, embryonic and otherwise. The special facts which prove that creation is the result of design are developed in a series of sections, with the following results, amongst others:—1. All nature is combined into one system. 2. *Diversified* types exist under *identical* external conditions, showing, that it is not the conditions which cause the diversity of the types. 3. Similar types are repeated under the most diversified circumstances. 4. Unity of plan in otherwise highly diversified types of animals. 5. The correspondence, now generally known as special homologies, in animals otherwise entirely disconnected: their exhibiting "more immediately the power of expressing a general proposition in an indefinite number of ways, equally complete in themselves, though differing in all their details." 6. In like manner, "the various degrees and different kinds of relationship, among animals which can have no genealogical connection, exhibit thought—the power of com-

bining different categories into a permanent harmonious whole, even though the material basis of this harmony be ever changing." M. Agassiz lays down, in short, *thirty* conclusions of this kind, drawn from the facts of palæontology and zoology, and sums them all up in the general conclusion, that "all organised beings exhibit in themselves all those categories of structure and of existence upon which a natural system is founded, in such a manner that in tracing it the human mind is only translating into human language the Divine thoughts expressed in nature in living realities."* Thus unity of the law of design in organisms may be fully admitted as correlating the unity of the law of relation of the mechanico-chemical and vital forces.

134. How deeply this idea of unity of mental force is associated with our generalisations as to the primary laws and forces of matter, and therefore with all the derivative generalisations, may be easily shown from other considerations. For example, the idea of stability is necessarily associated with the great laws of necessary succession of events in nature. While the secondary or derivative laws may be infinitely various, they must be all ultimately regulated by some primary or more general law, which governs the whole series, and fixes them as a whole in some necessary order; otherwise they would be not only derivative but diverse. Such a state would be that described as Chaos; and hence, in cosmic speculations Chaos is anterior to mind. In human society such a condition of the people, as regards the laws, is termed Chaotic.

135. Or we may see this point in another light, by inquiring, What is the meaning of Chance? Now, chance has two meanings. First, it expresses the variable or

* *Essay on Classification*, p. 199, *sqq.*

contingent, without reference to any order or uniformity of succession or relation, as co-existence and the like. Here it is opposed to order, and means disorder. But disorder, in that sense, means no fitting adaptation of events or things to each other—no exercise, therefore, of the reason; unless, indeed, the disorder itself be an object, in which case the new order of events is of the relative or particular, and is itself order of a certain kind. In a scientific sense, the idea of chance (as we have seen) is wholly excluded from those fixed inevitable uniformities in the general laws maintained by the great forces of nature (132). What is immutably fixed must be inevitably order; and if there be an apparent deviation, it can be only apparent, and not real. The apparent deviations may or may not be traced to their proper positions; but if they cannot be traced, then the word Chance expresses our ignorance. It is a generalisation of the unknown as to order, law, and cause. It is the language-sign of the unknown in man's experience—the algebraic x of speech. And in proportion as science is developed, in the same proportion man is enabled to pass from estimating the chances or probabilities of events, to predicting the events themselves. Hence the true test of a new general truth in science is, that it adds to the power of prediction already possessed.* Thus design is as much a part of the phenomena of creation as force, law, or uniformity. Each correlates the other.

136. Further, if the vital forces be derivative of the physical forces, which we may now accept, temporarily at least, as a truth in science, it necessarily follows that the law of design which characterises them must be derived from the physical forces; and if it be admitted that there be but one universal and absolute (90, 91), then it is logi-

* Mr J. S. Mill. *System of Logic*, 4th edit. vol. i. p. 322.

cally necessary that Mind, as manifested by a law of design, is that universal and absolute. Again, in no other way can we conceive Mind as being absolutely universal—that is, both in the relative universal, and the particular—that by the doctrine that it is the universal of the physical forces of creation in our cognition of force, of which vital forces are the variable, contingent, and derivative. Again, a mental force must have a correlative law (97); now that correlative law in creation is a universal law of design.

137. Mind, in its highest determination, is that which regulates, as its ultimate end, the application of force to desirable results (p. 105). Upon this all art, all morals, all government and order depend. Hence all the laws of society are necessarily correlative with an executive—that is, with an agency for the application of physical force sufficiently energetic to compel men, in the last resort, to adapt their actions to the prescribed order. The explosive force of gunpowder is in modern times the chief force of this kind; and in royal arsenals, cannon were formerly inscribed with the significant words, *Ultima ratio regum.*

138. It may be advanced, that this so-called design is only the mode in which the phenomena of creation are presented to our consciousness, and that there may be, in fact, no designer. It is the universal element worked out to its final development in the most comprehensive generalisation. I am not prepared to affirm the proposition that the human mind should be accepted as the measure and criterion of all things; on the contrary, it is finite in its powers, and can only conceive—not comprehend—the infinite. Nevertheless, it must be conceded that, according to the fundamental laws of human nature, a fixed order cannot do otherwise than indicate

to man a designer—that is, one that conceives the order and fixes it; and, inasmuch as the succession of events which manifest design necessarily imply the exercise of a correlative force, it necessarily follows, also, that the designer originates and exercises the force. In other words, it is an inevitable conclusion from the premises, as well as from the common sense and experience of mankind, that in creation there is a Supreme Mind which is the first cause of order and motion. Motion and order, therefore, are Thought in act.

139. Thus from every point of view, a law of design includes in a higher generalisation all the great laws of creation. It is proved by the experience and general belief of mankind; by the mathematical demonstrations of a Laplace; by the conclusions of the naturalist; by the fundamental principles of metaphysics; and by the most rigorous logic. And when we come to apply the generalisation deductively, as a fundamental principle of philosophy, we shall find that it will stand the test of all truth—viz., of being practically applicable to the wants of mankind (p. 89).

CHAPTER V.

GENERAL FORMULA OF THE CORRELATIONS OF LIFE AND CONSCIOUSNESS.

140. We are now in a position to formularize the fundamental law of the relations of body and mind. As to the latter we have—1. The fundamental *intuition* that we are two things in relation to each other—namely, Matter and Mind. These we may designate the thing that is adapted, and the power that adapts to ends (137). 2. We have established on *d priori* grounds, as a more definite conception of the fundamental intuition, that there can be no existence except in the *synthesis* of mind and body—the subject and object, the thing adapting and the thing adapted (87). 3. That in attaining to a knowledge of truth—that is, of the real relations of events or things to each other—we follow intuitively a fundamental method developed in the "Doctrine of Relation" (88), which consists in placing two cognitions in relation to each other, termed, therefore, the relative and the correlative. 4. That it is by the analysis and synthesis of cognitions in relation to each other a mutual mental process is completed, and a thought or idea rises in the consciousness.

141. As to body as matter—1. We have the fundamental law that motion and change constitute all phenomena. 2. That the fundamental law of motion and change is, that a portion of matter in motion, whether it be an atomic element or atom, or a mass of atomic ele-

ments, will communicate its own motion to another atomic element, or mass of them. 3. That the various phenomena of which we have knowledge, are only known to us as due to definite motions amongst masses or atoms in relation to each other. 4. That the expression of these relations in words or signs is the law, conception, notion, or idea of the relations. It follows, therefore, that the fundamental law of all phenomena, whether they be those of Matter, Life, or Thought, is the same. This law may be termed the Law of Relativity.

142. The law of Relativity has its derivative laws, or, in other words, laws of the relations of the motor forces to each other, or of the atoms moved. These relations, when stated definitely, are, as to matter, simply the laws of matter. They differ according as the motion is between masses and atoms. The laws of the former are those with which the mechanical sciences have to deal—those of the latter are the subject-matter of the mechanico-chemical sciences.

143. The derivative laws of Relation, as manifested in life and organisation, are the subject-matter of the natural history sciences, and vary according as they express the relations of masses or atomic elements. To the former class belong the Natural History sciences proper—to the latter, Physiology or Biology. But in life and organisation the teleological relations have to be considered, or, in other words, the functions of organs—*i.e.*, the ends attained by the vital forces.

144. The laws of Relation, as manifested in Thought, are termed Ideas, or states of consciousness. When the phenomena are co-existences, they are active or volitional states; when successional, they are as to thought associations of ideas; as to actions are motives, habits, and the like. In all cases the laws of relation of the vital forces

correspond to intuitions, conceptions, notions. Since the relations of all the phenomena of creation, whether they result from physical, vital, or mental forces, can be reduced to relations of force and motion, it follows that a complete knowledge of those relations is that which is expressed numerically. But, inasmuch as the law of design dominates over all the forces, TRUTH is only attained when not only the relations are duly expressed, but their ends or results known.

145. The preceding views were substantially first publicly stated by me in 1839, in a paper written in 1838 (*Edinburgh Medical and Surgical Journal*, January 1839), and again more explicitly in 1840, when I observed:— "If we would obtain a large and definite knowledge of the action of force upon matter and intelligence, in exciting the phenomena of Life and Thought as displayed in man, we must examine the laws of its action, as exhibited in every living organism, and in the molecular changes of inorganic matter. A thousand circumstances assure us that, between these last and the highest efforts of human intellect, there is a continuous chain of phenomena, although we are unable to follow it link by link." And after passing in review some of the series of this chain, I added—"These principles are of the highest importance. They form the connecting link between the phenomena of consciousness and the molecular changes in organic matter, upon which the phenomena of heat, electricity, galvanism, and magnetism depend. They point out a new path of experimental inquiry into the phenomena of Life and Thought, and if traced out in all their relations, cannot fail to change the whole aspect of mental philosophy."*

* *A Treatise on the Nervous Diseases of Women*, by Thomas Laycock, M.D. (1840), p. 91, § 155, to p. 100, § 171.

CHAPTER VI.

IDEAS AS CAUSES.

Sect. I.—*General Doctrine of Ideas as Causes.*

146. In determining more particularly the relations of Mind to Phenomena, as the first cause thereof, we have to bear in mind that the objects of our researches are twofold—viz., to satisfy the mind inquiring after truth, and to develop principles capable of application deductively to the wants of mankind in Art (p. 32). And since our knowledge is based upon conscious states, it is to the laws and modes of action of our own minds, as revealed in consciousness, that we must refer all our investigations into created things. Now, there are two distinct lines of investigation open to us, such as have been hitherto followed, each to the exclusion of the other, or we may combine the two methods, and thus reach results attainable by neither. First, we can consider Mind in the abstract, or as "pure Reason;" ascertain its general laws as derivatives of the law of design, *à priori*, or deductively; and examine their results as manifested in the phenomena of creation. This procedure would give us the institutes of a teleological metaphysic. Secondly, we can consider Mind in the concrete; ascertain its general laws inductively, as results of the derivatives of the law of design manifested in the phenomena of consciousness; and apply them to an elucidation of the phenomena of life

and organisation. This procedure would give us the principles of what has been termed Mental Physiology; but more correctly, I think, we might use the term *Mental Dynamics*. By the *first* method we should be able to develop the fundamental ideas, truths, or intuitions of the human mind, as derivatives from the Supreme Mind; by the *second*, we should be able to show the relations of these ideas, truths, and intuitions, considered as states of consciousness to the ever-changing phenomena of existence. But the *third* mode is that which demands preference; for inasmuch as no state of consciousness whatever happens without correlative vital processes, so it follows that no vital processes, whatever they be, or however they be named, happen independently of their correlative ideas and intuitions of mind in the abstract. Hence the necessity of following, with a view to practical results, both the lines of inquiry conjointly. It is requisite, however, to re-state first principles, so as to understand explicitly, and without doubt, that when conducting teleological inquiries into the phenomena of life and organisation in correlation with thought, we have to modify fundamentally our method (p. 88). Hitherto science has been satisfied to determine what uniformities and coexistences are constant, and what have been found to vary, with the conditions of variation. The inquirer could therefore content himself with an expression of the order of succession of events as a law, without reference to the ends aimed at, and designate as force that which he conceived to be the cause of the succession. In investigating the order of phenomena as subordinate to a law of design, we must pass beyond these questions, and inquire both what ends are aimed at, and what are attained according to the law. In other words, physical and vital research must be immediately subordinate to

teleological research (p. 107). This is especially true of the phenomena of life and organisation; for just as the varied phenomena of external nature are only apparent deviations from the fixed unchangeable laws of nature, and are dependent upon their correlative forces, so the varied phenomena of existence are only apparent deviations from the fixed unchangeable law of design, and are dependent upon its correlative force, or that which is called Mind (138).

147. But this teleological method also necessarily implies an inquiry into the causes of the order of events to ends; or, in other words, the causal relations of Mind to the infinitely various phenomena of creation. In conducting this the etiological portion of teleology, however, we cannot deviate from the method of procedure by which we arrive at a knowledge of physical causes. Yet we have this important difference between the two kinds of phenomena, that Mind is the final cause of all phenomena, and therefore of the physical forces themselves. Motion and order (we have seen) are Thought in act. Hence, teleology is in one sense but another word for *etiology*, or the doctrine of causes in general. Mind, thus conceived as the universal force, has its derivative or particular forces, which, like the derivative forces of creation, cause the apparent deviations from the general law of design manifested and maintained in creation (98, 101). Such derivative mental forces (as we will term them) correlate necessarily all the operations of the particular physical forces; so that whatever is variable and contingent in Mind, is correlated by what is variable and contingent in Matter. But this general law runs throughout, namely, that as Mind is necessarily antecedent to the phenomena of the universe in general, considered as dependent upon the great physical forces, so Mind is necessarily antecedent

to all the particular and variable phenomena of creation, considered as dependent upon derivative, particular, and contingent physical forces; or, in other words, it is the final cause of those phenomena.

148. In our own experience of our varying mental states, we find this to be the general law. Whenever we are conscious, we find that thought precedes act; or, taking special instances, we feel that special states of thought precede special states of both thought and action. Such are the states which are designated by the terms *sensation*, *conception*, *desire*, and the like. More particularly we speak of special states of *abstract* thought as *ideas;* or popularly, the term is applied to all states in which the intuition of design is involved. In this way it happens that the notion we form of the universe, and of its subordinate parts, is that of a structure or system, not beginning of itself, but designed (130) in the same way that an architect would lay down the plan of a house, or a lawgiver a scheme of polity of a nation. The entire scheme or plan is the Idea of the designer; and the schemes of plans of special details—as of this or that room for such or such uses, or such particular laws or orders adapted to anticipated circumstances—are the subordinate ideas of which the general Idea is constituted. But there is this difference between the work of the human mind and that of the Great Designer, that whereas the agency of human hands is needed to carry out the ideas of the scheme or plan of the human mind,—in the grand scheme of creation, and in all its subordinate and infinitely varying details, the ideas themselves are the causal agents—*i.e.*, the immediate antecedents to all phenomena. "In the idea," says Kant, "pure Reason possesses even causality, and the power of producing that which its conception contains. Hence we cannot say

of Wisdom, in a disparaging way, 'It is only an idea.'"*

149. But in examining the order of events in life and organisation, or even in creation at large, we must take the utmost care not to extend this doctrine of ideas as causes beyond its legitimate bounds. The word is in truth only another word for Mind in relation with something else. So that when we say a general idea is the cause of all its derivative ideas, and these in their turn the causes of the dynamical changes which they correlate (being the immediate antecedents to these changes), we do not mean *cause* in an absolute sense, for there is only one absolute—namely, the Supreme Mind. The immediate antecedents, considered as ideas, are only, therefore, ideas-in-correlation-with-their vital and physical forces, out of which correlation they cease to be causes—or rather, are non-existent as active agents. The utmost that can be granted is their potential or latent existence (59). This remark applies most particularly to ideas considered as states of consciousness, in which the series of vital changes are wholly hid from our consideration objectively, and which are only presented as results of the series of vital changes—that is to say, of the ends attained. Since an act of energy—whether it be thought or will—takes place at the same moment that the result is attained, the correlative conscious idea and the feeling of energising are coincident with the correlative vital changes; but the vital changes may, and do, occur, although there be no consciousness, either as to the act of energy or the idea. This is the unconscious state of Existence (45, *sqq.*), and includes the "mental latencies" of Sir W. Hamilton (61).

150. Further, when we investigate ideas as causes, it is of the utmost importance to remember the true nature

* *Kritik der Rein: Vernunft.*

of a cause—namely, that it is that which is the necessary antecedent to, or co-existent with, an event. For it follows, that since all the phenomena of creation are successional and co-existent in time and space, every existent and antecedent must have a co-existent and antecedent; or, in other words, have a cause of which it is the effect. So that there is a necessary co-existence and unbroken succession of events implied in the idea of Cause. This is learned as a matter of experience by every one who examines the succession of his own thoughts; for, as we have seen, that is wholly beyond his own control (31). To use the expressivewords of Sir William Hamilton, "The mind [organism] energises as it lives, and it cannot choose but live; it knows as it energises, and it cannot choose but energise" (32). The life of a man is therefore like a stream of events or changes in linked sequence, flowing on as necessarily as the waters of Niagara. It is true that, in common language, the *will* is spoken of as the first cause of conscious thoughts and acts, but no act of will (that is, of mental energising) can occur without *its* necessary co-existents and antecedents—that is, its causes; and such as these are, so will the act of will be. There is, in fact, no more a spontaneous act of will than there is spontaneous generation. Strictly, such an act is a creation, and belongs only to creative power.

151. And this general truth points to another—viz., that the causes of every present state of consciousness of organisms extend far back into time. Tracing the life of any organism whatever, we find that the necessary antecedent to its existence in time and space is the existence of another organism in time and space, and which is termed its parent. This, a fact of experience, is generalised in the scientific proposition, *Omne vivum ab ovo.* Tracing the antecedents upwards then,

genealogically, we are finally lost, as to observation and deduction, in the abyss of time, and end in thought with a Supreme Creative Mind as the final cause, whose *fiat* was the expression of his Energy to begin a series of events, and maintain them in necessary succession.

152. Dr Whewell, in discussing the philosophy of *palætiology*, shows how the series of causes and effects may be conceivably traced upwards to the time when this solid earth was, hypothetically, a nebula, or luminous, incandescent, diffused mass of matter; and so we may be "led by a close and natural connection, through a series of causes, extending from those which regulate the imperceptible changes of the remotest nebulæ in the heavens, to those which determine the diversities of language, the mutations of art, and even the progress of civilisation, polity, and literature."* This tracing of causation upwards is the determination of the "final" or last cause of the series; but it does not make the final cause different in nature from the nearer or efficient causes, except that it is the cause of *them*. The proper conclusion to which it leads is, therefore, that the necessary succession of events, with which we connect the notion of a succession of causes and effects, is due to one or a universal cause, operating throughout the whole series of successions. Thus, the first cause is therefore not only the one necessary antecedent, but the one cause of the entire succession. Every so-called cause is thus a derivative of this the final or true cause—a power ever causing orderly change.

153. Sir William Hamilton writes as a metaphysician to the same effect. "My doctrine of causality," he says, "is accused of neglecting the phenomena of *change*, and of ignoring the attribute of *power*. This objection precisely reverses the fact. Causation is by me pro-

* *History of Scientific Ideas*, 2d. edit. vol. ii. p. 276.

claimed to be identical with change—change of power into act ("omnia mutantur"); change, however, only of appearance—we being unable to realise in thought either existence [substance] apart from phenomena, or existence absolutely commencing or absolutely terminating. And especially as to power: Power is the property of an existent something (for it is thought only as the essential attribute of what is able so or so to exist); power is, consequently, the correlative of existence, and a necessary supposition in this theory of causation. *Here the cause, or rather the complement of causes, is nothing but powers capable of producing the effect—is only that now existing actually, which previously existed potentially in the causes.* We must in truth define a cause, the power of effectuating a change; and an effect, a change actually caused."*

154. Thus tracing up the series of causes of Life and Thought, we find that they must be all derivatives of, and contained in, the First Cause, however varied the resulting phenomenal changes or successions may be. "Mutation, causation, effectuation," adds Sir William Hamilton,† "are only the same thought in different respects; they may therefore be regarded as virtually terms convertible. Every change is an effect; every effect is a change; an effect is, in truth, just a change of power into act—every effect being an actualisation of the potential" (61). These doctrines as to the causes of mental and vital phenomena strike directly at the root of that fallacious notion so long current, that Consciousness is a true power or cause; the only true cause being Mind, considered as an ordering power or force.

* *Lectures on Metaphysics*, App. vol. ii. p. 538.—The Italics are mine.

† *Op. cit.* p. 540.

SECT. II.—*On the Modes of Derivative Evolution of Ideas considered as Causes.*

155. These doctrines as to the causes of things, and especially of vital phenomena, can only be of value in so far as they are applicable to man's experience in creation. To apply them with success, it is necessary that we should have as clear ideas as possible how derivative causes are evolved out of the first cause, considered as Mind. To this end we must separate Mind from its theological relations, and restrict ourselves to the scientific aspects of the question. In no other way can we even attempt to determine scientifically how human consciousness is evolved out of vital phenomena, and how the laws of Thought have their origin in the laws of Life, considered as results of a mental or ordering force to ends.

156. Now, in looking at the general results of Mind operating in creation, we find that they consist in an evolution or development of phenomena. A general idea is evolved into a number of subordinate ideas; or, in other words, there is the relation of domination (of the absolute), and subordination (of the contingent). But we can only know that Mind exists as it is made known to us by the operation of these ideas in us—that is, by the phenomena of our own consciousness; and in like manner, we can only determine the derivative evolution of them as causes by means of our mental powers acting through organisation; which, again, is the result of their action. In examining the forces of creation, it is found necessary to arrange them according to their effects; or, in other words, according to their laws of action. They are divided, however, by the doctrines already established, into general and derivative, dominant and subordinate, absolute and contingent, universal and particular, and

the like. Now, the most general force of this kind is the force of gravity or attraction, and its correlate, repulsion. Motion is the result of the reciprocal action of these forces. The derivative physical forces are those termed the imponderables—namely, heat, light, magnetism, chemical affinity, in an evolving scale of progress. Derivative again from these are the vital forces, which finally culminate in the *vis nervosa* and Mind. Now, throughout the whole of this series of forces, the one permanent universal result is motion; and all their results of these forces in operation may be resolved into changes of atoms in space in relation to each other (118–120). This special law is, however, manifest, that as they become more and more derivative, the changes induced become more and more varied, the relations of the atoms more and more complex, and the resulting phenomena more and more multiform.

157. It is even so with Mind, considered as the source of all phenomena. There runs throughout all its results one great universal result—order correlating motion. Its derivative powers ever become more and more derivative, and therewith the resulting changes become more and more varied, the orderly relations of the atoms of matter more and more complex, and the phenomena produced more and more multiform; until the highest evolution is attained in the profoundest thoughts of the mind of man, and the deepest knowledge of his own nature and of God.

158. In this systematic evolution from the general to the particular, it happens that, while the dominant idea regulates all the subordinate ideas, these latter also become efficient causes in their turn, as general ideas. This is more particularly seen on a large scale in the development of systems of government, religious polity, and the

like, with one fundamental yet restricted Idea as the basis. Thus, in the fundamental dogma of Islam, "There is one God, and Mahomet is his prophet," the first limb is a general proposition, which can be proved to be of universal acceptance amongst all nations and in all ages, wherever such a point of mental culture has been reached by man that the idea of one God could be rightly comprehended. The second limb is a proposition of limited acceptance in both time and space; for it could not, under any circumstances, be true, anteriorly to the existence of the individual named; was only believed by a few; and its acceptance is still limited to comparatively a small portion of mankind. Yet, as such, it determined the establishment of systems of civil and religious polity, which changed for a while the material and moral aspect of a great part of Europe and Asia.

159. This mode of domination and subordination of ideas is even more distinctly manifested in generation and development. The egg of an animal or the seed of a vegetable is seen to unfold itself, as it were, and part after part to be developed, until the general idea implied in the original scheme of construction is completely manifested. The process is also seen in the evolution of particular tissues. Thus, the vascular system, commencing with a single homogeneous vessel, carrying the nutrient fluid to and fro with a simple oscillation, is finally evolved into an elaborate apparatus, with a central pump and its valves and works, and with a series of subordinate distributing vessels, ending at last in minute and only microscopically visible ramifications. Such, also, is the law of evolution of the respiratory apparatus, and all glandular systems; and such the law of development of the nervous system and the mental powers. Nor have

there been wanting large speculations as to the singleness of the source of the varied phenomena of creation in regard to forces, of which we have already taken note;* or in regard to the evolution of organic life on this earth, of which class the work entitled *Vestiges of the Natural History of Creation* is an illustration; or even in respect to the entire scheme of creation, of which the "physio-philosophies" of the modern German school of speculation are examples.

160. Nay, even the moral world, the exclusive dominion of man on earth, is believed to be under this same law of derivative evolution of an archetypical idea into dominant and subordinate ideas; so that philosophers, moralists, and theologians seem agreed in the opinion, that Divine Providence has in view a grand and beneficent scheme, whereby man will be more and more perfected in all the essential qualities of his nature. In short, it is an increasing belief that the evolution of a fundamental and dominant idea is going on in the moral as in the organic and the physical world—a belief well expressed by the greatest of living poets:—

"For I doubt not through the ages one increasing purpose runs,
And the thoughts of men are widen'd by the process of the suns."

In this respect, Mind, as a force, is peculiar; for this law of the evolution of mental force shows it to be widely different in its effects from the mechanical forces. For whereas in these there is neither increase nor diminution in time, but only transference, as to Mind there is manifest increase and cumulation; since from age to age it appears to exert a wider and wider dominion over matter, and thereby to manifest a growing intensity in the operation of its forces. And this is the law of evolution of

* Chap. ii., "On the Correlations of the Physical Forces."

both individual organisms and of the great system of living things. It is concurrently with a higher and higher complexity and development that the phenomena of consciousness are evolved in lower organisms, as it is, in like manner, concurrently with a gradually yet more perfectly evolved system that Thought in the individual man is developed and strengthened. Mind, thus evolved in the concrete, culminates more and more as Mind in the abstract—that is, in a knowledge of the laws and order of Nature, and of the ends aimed at and attained by mind as a causal agent.

161. What is the meaning of this successional evolution of the phenomena of Life and Thought, and what results may arise, are matter for curious speculation. The human mind, with all its energies and aspirations, is the greatest of the known results of that ordering force known to us—yet it is but one result. What other kinds of consciousness may have been evolved, is not revealed to us by science, for we can judge truly of none except our own. What may be evolved in the lower forces of organisms is less and less easily determined as we pass downwards, from the vertebrates through the invertebrates, to the most general forms of organisms. What may be evolved as we ascend upwards, is wholly beyond our observation. We can only speculate as to "angels and archangels, principalities and powers," anthropomorphising in a dim, helpless fashion, as best we may. It is, however, at least probable, if not *à priori* certain, that man is not the only Knowing being in creation; and that, amidst the infinite diversity of created things, there are intelligent beings so widely different as to the ends of their existence from man, and therefore so differently constituted in relation to the forces of matter, that their objective existence may be utterly beyond our knowledge.

"Man," I formerly remarked,* "is at the head of a vast ascending scale of animal life, so extended in its connections downwards, that for the present purpose it may be considered as infinitely extended. With our existing knowledge of the uniformity of the laws of creation, the deduction is absolutely incontrovertible, that the scale of being is not truncated at man, and that beyond him there cannot be a dark, unpeopled void. The law of gradation of development, rigorously pushed to its legitimate conclusions, points out an infinite gradation of Being, above and superior to man. That we cannot see such Beings, nor demonstrate their existence, is a necessary result of our position in the scale, and no proof whatever of their *non*-existence. The worm knows nothing of man, his works, or his actions; nothing of the sun or the stars, or of the beings swarming around it; and so, with reference to the spiritual world—the world around and above *us*—our organs may be, and doubtless are, as imperfect as those of the worm with reference to the world around and above *it*." What this law may have in store for man in a future state, we know not. Here, "we see but as in a glass, darkly." Certain it is, that the imagination is lost in the contemplation of the Conceivable, when we meditate upon this great law of evolution of the WILL OF GOD.

> "There's not the smallest orb, which thou behold'st,
> But in his motion like an angel sings,
> Still quiring to the young-eyed cherubim.
> Such harmony is in immortal souls;
> But while this muddy vesture of decay
> Doth grossly close it in, we cannot hear it." †

Thus, then, we come to the conclusion that ideas are causes, in the true sense of the term, of the phenomena of

* "Essay on the Reflex Function of the Brain," *Brit. and For. Med. Review*, Jan. 1845, at the close.

† Shakespeare. *Merchant of Venice.*

nature. And we are led to this by all possible testimony; namely, the evidence of our consciousness, the inductive researches of science, and the most lucid and comprehensive doctrines of philosophy and religion. They are the energetic causes of order in all cosmic and molecular phenomena, and of growth, development, nutrition, instinct, consciousness, thought. But they are energetic causes only as derived from the Supreme Thought of creation—the first cause of all things; and they energise, or are manifest as causes, only when in correlation with the physical and vital forces which operate in nature.

SECT. III.—*Classification of Ideas as Causes.*

162. We may now proceed to classify ideas as causes, so as to determine at least the principal groups, and thus be able to apply these doctrines of mental causation to the laws of organisation, the order of vital phenomena, and the fundamental processes of thought.

Looking at Mind in the abstract, and as the universal Cause in creation, we can consider it in the light of a GENERAL IDEA, with its subordinate elements or derivative ideas. Let us inquire, then, what is the most general idea in the physical and vital phenomena of creation. As we have a series of co-existences and successions to consider with reference to the cause of their order in the observed series, we can only look at the END attained as the correlative of the IDEA which rules them. But to attain an end implies combined action for its attainment, when the agents are many. Hence, without here confusing the reader with a detailed argument, the end attained in creation may be safely assumed as the union of all things into a harmonious whole. The most general idea, therefore, of such a scheme or plan is the *idea of unity*.

This idea will consequently be, *first*, an efficient cause of unity—be energetic to that end—in correlation with the great forces of creation; and, *secondly*, will be an equally efficient cause of unity—be energetic to that end—in all the derivative, variable, and contingent manifestations of these forces. As such, it will be "the universal" in all ideas. Such an idea is obviously to be distinguished from those complex and derivative states of consciousness in which the idea is known or felt as a dim intuition. The term by which I would distinguish this class of general ideas is *teleiotic*, from τέλειος (derivative of τελος) *summus*, *perfectus*, thereby denoting their special characteristic as the class of absolute and complete ideas. We may therefore designate unity a fundamental teleiotic idea.

163. Teleiotic ideas differ accordingly as they are primary or derivative, and according to the ends arrived at. We have already marked out three classes of phenomena—the physical, the vital, and the mental or conscious (p. 88). We can therefore distinguish three corresponding classes of teleiotic ideas. The terminology only requires modification. Thus, the physical forces are either *cosmic*, when considered in reference to the laws of motion of the heavenly bodies; or *molecular*, in reference to the molecular forces, of which chemical affinity is the most striking. We might therefore use the terms cosmical, physical, and chemical, to designate the ideas or causes of action to ends which are in correlation with those forces. The term "vital" is of doubtful propriety, as it is already used in various senses. The word "zoical" would be more accurate, if the root of the word was not limited to animal life. Upon the whole, therefore, seeing that the word βιος is already adopted in *Biology* to indicate the science of life, the word "biotic" would best designate the teleiotic ideas of life and organisation. There remain the teleiotic ideas

of conscious states of existence, the *noetic* ideas, and which may be classed under two heads—namely, 1*st*, as they are known simply, but not in their relations; and, 2*dly*, as they are known both simply and relatively. In the former class are comprised all the intuitive ideas or fundamental "intuitions" of the metaphysician, and the "instinctive" feelings of the naturalist. The well-marked characteristic of this class is their "necessity"—*i.e.*, their necessary causal relation to all states of consciousness and vital action. In the latter class are all the notions reached by the aid of experience, but which necessarily include fundamental intuitions as their primary elements. This class of ideas, in the popular sense, are "motives;" they are the causes which influence to this or that line of conduct. According to the preceding views, there are two classes of such ideas—namely, the teleiotic ideas of consciousness or intuitive ideas, and the varying, contingent, and particular ideas, which result from what is termed experience, but which nevertheless contain that element of the teleiotic idea from which they are derived (156). Thus, the primary teleiotic idea—namely, unity —realised in the consciousness, as the feeling of oneness (the *Ego*), is the absolute or universal in intuition and every cognition of experience (82).

CHAPTER VII.

INTUITIVE IDEAS AND NECESSARY TRUTHS CONSIDERED AS MOTIVES TO ACTION.

164. Metaphysicians have discussed in various ways, and under various phases, the question whether all our knowledge is the result of experience; or whether, by the constitution of our nature, we have knowledges independently of experience, or which only require experience for their development. According to the one view, the mind is a *tabula rasa*, or like a sheet of white paper in which experience writes its teachings; according to the other, there are innate ideas, powers, or capacities, in the *tabula* or paper, which are there independently of experience. Whenever these questions have been discussed according to the usual method—that is to say, when the sources of our knowledge have been inquired into, without regard to the laws of action of the vital forces in those corporeal structures, in virtue of which we acquire any knowledge at all, incurable confusion has been the result. The two great sects between which philosophy has been divided have both truth on their side; that they disagreed at all was due, in fact, to the one-sided view each took of the question. In particular, in discussing the various moral and philosophical questions to which the problem has given rise, the phrases *intuitions* and *intuitive ideas* have been used synonymously with the terms *intuitive truths* and *necessary*

truths. Now these terms are not, in fact, synonymous, if we look at mental phenomena in their correlations with vital changes. Strictly speaking, an idea, considered as a causal agent, is neither true nor false; we might with equal propriety say that the force of gravity is true or false. It is only in its relations in consciousness that we can speak of an idea as true or false. Truth, then, as a quality, is a derivative, contingent, and variable idea; a special truth is the knowledge of an idea in its real relations—*i.e.*, a cognition of accurate experience. The essential quality of an idea is its necessity, in which it correlates law and force (149). Hence metaphysicians use the term *necessary* (literally, never-ceasing) correlatively with terms applicable to all the great laws and forces of nature. Thus Professor Ferrier observes: "The words 'unchangeable' (or permanent), 'necessary' (or essential), 'universal' (or common, or general), as here employed, are nearly or altogether synonymous. The unchangeable is that which cannot be changed in cognition, and is therefore equivalent to the necessary or universal. The necessary is that which cannot be dispensed with or got rid of in cognition, and is therefore equivalent to the unchangeable and universal. The universal is that which is everywhere and always present in cognition, and is therefore equivalent to the unchangeable and necessary. In contrast to these terms stand the words 'changeable' (or fluctuating), 'contingent' (or accidental), 'particular' (or peculiar). These, too, are mere variations of the same expression."*

165. Looked at from the teleological point of view, all truths are obviously necessary truths, inasmuch as what we term truths are only our cognitions, intuitional or acquired, of the fixed, immutable, and necessary order of events in creation, or of the correlative forces

* *Institutes*, p. 153.

upon which those events depend. Hence it is the quality of necessity which correlates all truth whatever. But we can distinguish between universal or general, and particular or derivative truths, just as we distinguish between general and derivative ideas, and general and derivative laws and forces. Now, as these are variable and contingent, because derivative, so there are truths which are correlatively variable and contingent, because derivative; these are the truths of experience. The fundamental truth of mental science is, that Mind regulates the application of force to desirable results (101). Within this generalisation all the other truths of mental science are contained as derivative truths. Or, if we examine the order of events as determined by the law of design, in discovering the results of that order we learn what are the fundamental or derivative ideas and truths. The truths are none other than the generalisations of science or of experience as to that order;—*e.g.*, it is a truth that all men die, that life is finite, that air has weight, that we see with our eyes, hear with our ears, &c. The ideas are none other than the results converted into cognitions, and considered etiologically and apart from the phenomena, as the law by which events were made to succeed each other in a fixed order. Thus, while an *idea* is that which conceivably and necessarily precedes the order of events in the mind of the designer, as cause; the *truth* is that which expresses the results of the order, as the manifestation of the idea in creation. The idea expresses the *noumenon*—*i.e.*, the order as it is thought or designed (148); the truth expresses the correlative *phenomenon*—the thought realised, or the order effected. Hence the idea is necessarily potential, the truth necessarily actual. It follows from these premises, that ideas and truths correlate the laws of creation; that funda-

mental ideas and truths correlate fundamental laws; derivative ideas and truths correlate derivative ideas and laws.

166. Turning now to an examination of the distinction made by metaphysicians between *à priori* truths and the truths of experience, we find that the distinction is the same as that made between the universal and the particular, the absolute and the contingent, the primary and the derivative, and the like. Examined teleologically from this point of view, the truths of experience are like those derivative results of general laws and forces which we attribute to chance: they are cognitions in which we do not perceive the absolute and the universal; they are generalisations in which the fact that they are intuitive or fundamental is not expressed or recognised (135). It is very obvious, then, that the truths of experience, when attained, are logically as necessary truths as the phenomena of so-called Chance are logically necessary phenomena. A truth of experience ceases, therefore, to have the quality of uncertainty when the general truth from which it is derivative is detected and formularised.

167. If we apply the fundamental law of all cognition to an elucidation of this question, we cannot but see that, in the widest sense of the term, all truths whatever must be truths of experience; for consciousness itself is but an experience of the vital changes within us. We do not even *know* that we exist as One, out of relation to something else (91). Now, a knowledge of that relation implies an anterior cognition of self and not-self, which cognitions can only be results of the teleiotic or teleorganic changes going on within us to that end. Mr Mill, therefore, has rightly attributed even our ideas of Number to experience,* if the term be used in the sense

* *System of Logic*, book ii. chaps. v. vi.

here indicated; for it is obvious, that a man can only know himself numerically as one, by knowing that he is one in numerical relation to another *one*, or to several ones. In his own consciousness he has the intuition of *two*—viz., his mind and his body. An organism devoid of these intuitions is *mentally* non-existent—it is 0. "The first form of the expansion or manifestation of the mathematical monas, or of 0, is + −. The + − is nothing else than the definition of 0. 0 is the reduction of the positive and negative series of numbers upon which the whole of arithmetic depends. A series of numbers is, however, nothing else than a repetition of a +1 or a −1; consequently, the whole of arithmetic reduces itself to +1 −1."† The same law applies to our cognitions of things in space or time. It is of no consequence by what sign we indicate the two things in relation. If it be A, then A = A. That is, A, as known in one portion of space or time, equals A as known in another portion of space and time. The two states of consciousness differ only, in fact, as to the different relations of the A to space and time. But to the application of this difference a double experience of A in space and time is needed, and a synthetical comparison of the two experiences. This means nothing more than that experience is reduced to its simplest element;—it is Mind in synthesis with organisation—mind active.

168. The whole of Part I. on "Mathesis," in Oken's *Physio-philosophy*, is well worthy careful attention, as an aphoristic account of the operation of the Law of Relativity in developing our fundamental intuitions (141). And when it is remembered that all the phenomena of which the mechanical, secondary mechanical, and

† Oken, *Elements of Physio-philosophy*, translated by Mr Tulk for Ray Society, p. 10.

mechanico-chemical sciences treat, can be expressed numerically, and that the theory of the atomic force is based on the idea of a succession of positive and negative states of atoms—*i.e.*, a + − , + − in series—we can better understand how, according to the ancient Pythagorean doctrine, Numbers were made equal to Ideas as causes. Since the vital forces are derivatives of the physical and chemical forces of matter, so also will their laws be; and hence our fundamental intuitions must not only be intuitions of experience, but must also be numerical. Consequently, that can only be termed an absolutely true cognition of experience which is, or can be, expressed numerically. All others are comparatively varying, indefinite, and obscure.

149. Experience confirms the deductions of science regarding innate ideas, powers, capacities, and intuitions, considered as causes, and leaves us in no reasonable doubt as to the operation of such mental forces. The moralist recognises the universal law of innate universal tendencies to definite states of consciousness, and finds them so absolute in their operation that they cannot be overlooked, if we would influence men's minds:—

> "Telephe, vel Peleu, male si mandata loqueris,
> Aut dormitabo, aut ridebo. Tristia mœstum
> Vultum verba decent; iratum, plena minarum;
> Ludentem, lasciva; severum, seria dictu.
> *Format enim natura prius nos intus ad omnem*
> *Fortunarum habitum;* juvat, aut impellit ad iram,
> Aut ad humum mœrore gravi deducit, et angit;
> Post effert animi motus interprete lingua."*

The simple difference between one man and another is due to these laws of Mind. The common experience of man is so settled, indeed, as to this point, that no intelli-

* Q. Horatius Flaccus. *De Arte Poetica*, 103–111.

gent father neglects a consideration of the innate powers of his son, or his natural capacities as they are termed; knowing that no experience can contend effectually against connate tendencies. Practical men have asked rather, How could these natural capacities be evolved and utilised? or in other words, How could the experience of the individual be so directed as to secure their utmost strength of manifestation? The intuitive ideas of the metaphysicians are, in fact, none other than the correlative cognitions of the intellectual or other instincts, and which are evolved into the consciousness after the same law as the instincts proper are evolved (77). M. Cousin has likened this element of our nature to inspiration. "Inspiration," he observes, "is in all languages distinguished from reflection; it is the perception of truth (I mean of essential and fundamental truths) without the intervention of volition and of individual personality. We are but simple spectators of the fact—we are not agents; at least, all our agency consists in being made conscious of what passes in our view. In this there is doubtless already some activity, reflected upon, voluntary, and personal."*

170. Two things are to be distinguished in these innate things: *first*, the ideas as truths, or perceptions, or states of knowledge; *secondly*, the ideas as causes of other states of knowledge, or of action—*i.e.*, as *causal* ideas or motives. And upon these differences a classification may be founded. The intuitions, as truths or states of knowledge, have reference to all the relations in which man exists,—as towards God, his fellow-creatures, external nature, and the like; or in other words, they are moral, and religious, and intellectual. As incitements to action, they are motives,

* *Introduction to History of Philosophy*, translated by H. S. Limberg (Boston, U.S., 1832), p. 165.

feelings, sentiments, and the like. That all men possess potentially intuitions, as ideas or motives, is certain, although all men, or all races of men, have not the same intuitions, or intuitions of equal strength and scope. The differences in the intuitions constitute, in fact, differences of character in races as well as in individuals.

171. Examining the matter more specifically, it can be demonstrated by experience that man has an intuition of truth in the abstract. "The cause of assent to anything is its appearing to be true. It is not possible to assent, therefore, to anything which appears to be not true; because it is the very nature of the understanding to agree to truth, to be dissatisfied with falsehood, and to suspend its belief in doubtful cases. The soul, as Plato says, is never voluntarily deprived of truth, but what is false appears to it to be true."* And so a much more modern writer observes: "Observing that I possess an inner sense, quite distinct from my reasoning powers, which in an exceedingly delicate, small, and humble way influences my apprehensions both of things and people, I wait upon this spiritual instinct as quietly and reverently as I can; and by this sort of silent attention to its actings, I gradually acquire, as I believe, a just conception of the nature of truth."†

172. Man has also an intuition of moral truth. To this fundamental faculty of the human mind various terms have been given, and various theories as to its origin developed; these being, for the most part, expressive of its Divine origin from the Supreme Mind. It corresponds to the "God within the soul" of Pythagoras, and Epictetus, and Seneca; to the "eternal principles of justice" of Justin Martyr; the "light and law of

* *Epictetus*, book i. chap. xxviii.

† *Visiting my Relations*, p. 215.

nature" of St Paul, Cicero, and others; to the "natural revelation" of Locke; to the "light of truth," the "Divine Spirit," "conscience," "reason," of numerous writers. Such an intuition, developed into special truths, is the admitted foundation of all natural religion by all those who admit a natural religion at all. Further, this doctrine was applied at a very early period to an explanation of the origin and nature of abstract or mathematical ideas. Such axioms as that equals added to equals make equals; that cause is in the order of nature before effect, and the like, were looked upon as eternal, immutable truths. This class of ideas corresponds to the "universals" or "intelligibles; to the "pre-established principles," the "unchanging," and the like. They are the "innate ideas" of Descartes, as opposed to the "adventitious."

173. Hobbes and Locke opposed this doctrine, and maintained that all our knowledge is the result of experience; and their views have had the support of some great thinkers. But a modified doctrine has sprung up, which may be termed Eclectic—namely, that although there are doubtless fundamental intuitions or *modes* of thought, they require what is termed *experience* for their development into thought—experience being here a term really indicative of vital as well as mental activity. This question is that which Kant examined in his famous *Kritik der Reinen Vernunft*, in which he demonstrated logically that there are intuitive ideas. Before him, or contemporaneously with him, Reid taught the same doctrine empirically. "The criterion—the index by which Kant discriminates the notions of *pure* or *à priori* origin from those elaborated from experience"—(Sir William Hamilton writes), "is their quality of necessity; and its quality of necessity is precisely the quality by

which Reid proves that, among others, the notion of causality cannot be an educt of experience, but must form a part of the native cognitions of the mind itself."* Sir William Hamilton adds, that the term *à priori*, by the influence of Kant and his school, is now very generally employed to characterise those elements of knowledge which are not obtained *à posteriori;* are not evolved out of experience as fictitious generalisations, but which, as native to, are potentially in "the mind" antecedently to the act of experience *on occasion of which* (as constituting its subjective conditions) *they are first actually elicited into consciousness.* These, like many—indeed most—of his technical expressions, are old words applied in a new signification. Previously to Kant, the terms *à priori* and *à posteriori* were, in a sense which descended from Aristotle, properly and usually employed, the former to denote a reasoning from cause to effect—the latter, a reasoning from effect to cause. Sir William Hamilton very truly observes, that the first problem of Philosophy, although one of no easy accomplishment, is to seek out, purify, and establish by intellectual analysis and criticism, the elementary feelings or beliefs in which are given the elementary truths of which all are in possession. Professor Whewell, entertaining the same convictions, has very successfully endeavoured to detect, by an inductive method, the fundamental ideas from which universal and necessary truths are derived, so as to give them a practical application to an improved method of scientific research.†

174. That there are necessary truths or laws of reason, is now fully recognised by the best living metaphysicians, but the fundamental importance of determining them is

* *Supp. Dissertations—Reid's Works*, note A, § 3, p. 753.

† *History of Scientific Ideas*, 3d edit.; London, 1858.

hardly comprehended by many; and it is not without justice that Professor Ferrier asserts that "the unfounded assumption that the class of necessary truths, or laws of reason, is either null or of very limited extent, and the effrontery with which their investigation has been proscribed, as an illegitimate pursuit, have contributed more directly than any other cause to arrest the improvement of speculation, and to render it a vague and unreasoned science; for Philosophy executes her proper functions only when dealing with necessary truth. This cause, however, is merely an exemplification of the more comprehensive cause already pointed out; for the necessary truths of reason, being the most primitive elements of philosophy, and the first in the order of things, are fixed by that very circumstance as the most obstinate in concealing themselves from view, and as among the latest that shall be brought to light."*

175. There is yet another important question to be considered which arises out of these doctrines—namely, What is the character, and what the origin, of false or erroneous ideas, notions, or motives? It is a matter of common observation and daily experience, that men have the strongest convictions of the truth of certain ideas or notions which all mankind, not lunatics, would agree in designating as false. A lunatic, for example, infested by a fixed idea, has an unalterable conviction that he is in possession of a fabulous amount of wealth, or is endowed with supernatural powers, or holds some high office, as Pope or Emperor, or suffers from certain imaginary agents, or is afflicted with imaginary and impossible diseases. So also with persons not generally recognised as lunatics, who believe in notions equally false as those of the insane, or are given over to wild and extravagant

* *Institutes of Metaphysic*, p. 22.

conclusions from false facts. How, we ask, are these false cognitions to be explained?

176. This department of delusive knowledges, noted as morbid, or trenching on morbid states, opens up the inquiry as to what is *physiologically* necessary, fundamental, and universal in our cognitions. We have seen that, as a generalisation of experience, man cannot but be conscious in certain modes (31), but those modes are necessarily coincident with the results of the operation of the vital forces, whatever those may be. Hence he cannot but think in accordance with the laws of the vital forces. He may know that certain cognitions which thus arise are delusive; but still, even that knowledge is equally the result of the operation of the vital forces. This is proved by the mental state known as dreaming, when the vital state of the encephalon and of the external senses is such, that we see no incongruity whatever in what, in the waking state, are the most incongruous cognitions. Such is also the state in delirium, and such also, in a more permanent degree, in various forms of insanity; for in these the leading characteristic is that of necessity. So soon as the disorder is so extended in the encephalon that no correct cognition or volition is possible, the man must think, and act, and feel according to the disordered operation of the vital forces, on which the disordered states of consciousness depend.

177. The element of the so-called necessity—that by which Kant and Reid distinguished *à priori* truths, or truths independent of experience—attaches, therefore, to all modes of existence as well as states of consciousness. It is equally the law of life and organisation, as of thought. "Can a man, by taking thought, add one cubit to his stature?" It is the law of all instinctive actions and processes. Can a man suffer or not suffer pain as he

wills? It is the recognised fundamental law of the association of ideas in thought (32); for necessity means, in this sense, nothing more than the immutable, inevitable order of creation, according to the laws of the Supreme Mind. Guided by these views, then, we can seek with propriety for the causal ideas and truths of experience in the fundamental ideas and truths, of which they are the derivatives; or, in other words, we have to seek for the particular in the general. To this end it is necessary to establish what is general either deductively, *i.e.*, *à priori*, or inductively from the conclusions which experience communicates. In either case we know that there are potentially present in the man a series of universal, fundamental, and necessary ideas, correlating equally universal, fundamental, and necessary cognitions or truths, with which the faculties are necessarily busied in all present states of consciousness, and which, becoming active during each state, are the necessary causal elements of the thoughts and acts. These are what I have termed the noetic teleiotic ideas (p. 286).

178. Examining these noetic ideas as causes, we observe that they follow the general law of ideational evolution. Every idea is evolved in the consciousness, in co-existing and successional relations, as a general idea; that is, as *one*, and in relation with the whole man as one. So evolved, it is the predominant or leading idea—the form or species of that man's mind—and is duly realised both in organisation or vital energy, and in functional energy. In this way the physiognomy, expression, tones of voice, bodily movements, and actions, generally correspond to the dominant idea or group of ideas. They are all in such relation to each other that the observer grasps the whole as a unity, and connects that whole with the ideas, motives, or predominant mental

energies operating within; and is thus enabled to discover, by the outward realisation in automatic or conscious vital changes, the inevitable mental character, which is often studiously concealed.

179. This doctrine being assumed as established, I may here venture to ask the oft-repeated question, By what method of inquiry can we best attain to an accurate knowledge of the fundamental ideas and truths of Reason? Must we seek for them in the contingent, fleeting, complex, and everchanging states of the human consciousness—the never stable opinions of men—or in the absolute, universal, and necessary ideas and truths of absolute and universal Mind, as manifested in creation? The latter, according to the principles hitherto enunciated, must be the method; for in this one way we study at their origin and source all fundamental ideas and necessary truths, inasmuch as, in accordance with those principles, all the necessary intuitions and fundamental powers of the human mind must correspond to derivative results of the general law of design operating in and through the vital forces (156, 157). That is to say, every fundamental state of consciousness must be coincident with the laws of action of the vital forces, as expressive of teleiotic ideas, and as manifested in the results attained by that action, in accordance with the law of design. And since these vital forces are but derivatives and correlatives of the physical forces, it follows, that those results of their actions which coincide with states of consciousness must correspond to correlative results in the external world; or, to state the doctrine dogmatically, all the intuitive ideas and truths of the human mind are to be discovered inductively, as results of the great law of design, and correspond necessarily, therefore, to the fundamental ideas of the Great Thought of creation.

180. If these views as to the physiology of fundamental ideas and necessary truths be admitted, then it must be likewise admitted that a criterion of truth may be attained both scientifically and metaphysically; for we can correct the dimly felt intuitions of our own consciousness, and the imperfect results of our own experience and observation, by comparing them with the fixed, immutable, and eternal Ideas of the Divine Reason, as deduced from observation of the orderly succession of phenomena in creation. It also necessarily follows from the same premises, that such a comparison, founded on the results of careful observation and deduction, can supply (nay, can alone supply) the true first principles of a science of IDEOLOGY, or metaphysic—a science which, so founded, would be entitled to take its place at the head of all the natural sciences, and put speculation and theory in their due subordinate position in all the derivative sciences, whether of matter and its forces; of life and organisation, and their forces; or of the human mind and human nature, in their relations to creation and the Creator.

181. I shall shortly develop these views; but I would here add that they are not without important confirmation on the side of metaphysic. Thus M. Cousin remarks, "Truth may be perceived by Reason in its human state, if I may so express myself, yet not always correctly; but even then, Truth itself is neither altered nor destroyed; for it subsists independently of that human reason, which either does not perceive it at all, or perceives it incorrectly. Truth in itself is as independent of Reason in its present state [manifested in Life] as Reason in itself is independent of man, in whom it appears. And having thus separated it from the fallible reason of man, nothing remains but to refer it to Reason not yet fallen

into humanity—to universal, absolute, and infallible Reason; to eternal Reason, which is without space or time, or any contact with anything relative, or contingent, or erroneous; to that Intelligence of which our own, or rather that which appears in us, is but a fragment; to that pure and incorruptible Thought, which our thought reflects. This is the theory of Plato and of Leibnitz—the theory which I have myself adopted, and which on former occasions I have so fully developed from this chair."* To the same effect Cudworth writes: "And from hence it is evident, also, that there can be but one only original Mind, or no more than one understanding Being self-existent; all other minds whatsoever partaking of one original Mind, and being, as it were, stamped with the same seal. From whence it cometh to pass, that all minds, in the several places and ages of the world, have ideas and notions of things exactly alike, and truths indivisibly the same. Truths are not multiplied by the diversity of minds that apprehend them, because they are all but ectypal participations of one and the same original or archetypal Mind and Truth. As the same face may be reflected in several glasses; and the image of the same sun may be in a thousand eyes at once beholding it; and one and the same voice may be in a thousand ears listening to it: so, when innumerable created minds have the same ideas of things, and understand the same truths, it is but one and the same eternal Light that is reflected in them all ('that Light which enlighteneth every man that cometh into the world'), or the same voice of that one everlasting Word, that is never silent, re-echoed by them."†

* *Op. cit.* p. 129.

† *The True Intellectual System of the Universe*, book i. chap. v., close.

182. It is in the methods of development and application of these views as to intuitive ideas and necessary truths, rather than in the fundamental principles, that I differ from the most eminent metaphysicians. The "pure Reason" of the latter, or "the Reason" simply, corresponds with what I have designated Mind. But whereas in metaphysics the pure Reason is separated in theory and in observation from life and organisation, and all the results of the great forces of nature, Mind, according to my views, necessarily gives rise to, and correlates, the forces of nature, and is thus the final cause of all created things, and of all the changes in them. It may advance the subject if Mind be considered scientifically from this point of view.

CHAPTER VIII.

MIND CONSIDERED AS THE FIRST CAUSE.

183. The object of this work being purely scientific, it hardly comes within its scope to discuss the nature of the Deity as the Creator and Governor of the world. This is the business of Theology, or of that speculative philosophy which, abandoning induction, seeks to find in metaphysical or *à priori* deductions a solution of that great problem. Besides, the moral relations of man to God are so solemn, that it seems hardly fitting to discuss them as scientific questions. And yet Science is eminently religious, as we have seen (p. 84); so that, if the question be approached in a suitable spirit, the speculations of the philosopher and the teachings of the theologian may be compared with the conclusions of science, without incurring the charge of impiety or presumption.

184. Mind, we have seen, is the cause of all phenomena; it is therefore the cause of all vital action and of all thought. And it is not the cause as if it were remote and occasional; on the contrary, it is an ever-present, ever-operating, internal force or energy. Now, since Mind thus manifested is but another word for the Supreme Designer and the Source of all power, it follows that God is in a relation with all the phenomena of creation, as their Cause.

185. Many and very different systems of physio-philosophy and speculative theology have been founded upon

this general proposition, in all ages and among all civilised nations, whether of the east or the west. We need not stop to examine any of these.* There is one point, however, which, on account of its scientific importance, may be noticed—viz., the theological doctrine of the natural likeness of man to God, as the Cause of his being. The Mosaic account of creation affirms that God made man in His own image, after His own likeness.† This declaration cannot possibly be interpreted as referring to anything else than man's mental and moral nature; any other inference would be to teach from Scriptures a doctrine they also repudiate—viz., an organic anthropomorphism. Such being the fact, we can only view the Scriptures as teaching, in philosophical phrase, that a *perfect* man is a phenomenal realisation of the most fundamental idea of the Divine Mind, and of all its derivative ideas. That there should be a fundamental idea is logically necessary, if the existence of a Supreme Designer be admitted; and that such idea should be realised, is equally a necessary conclusion. That man is the realisation of an idea of the Divine Mind is therefore a truth of revelation, a truth of intuition, a truth of philosophy, and a scientific induction.

186. Before examining this Godlikeness of the archetypal man, it is necessary to determine what is included in the notion. We may learn it—*first*, from the natural history of man as an organismic realisation of the

* The reader will find a vast store of learning brought to bear upon these subjects, so far as connected with European speculation, in Cudworth's great work, *The True Intellectual System of the Universe.*

† "And God said, Let us make man in our image, after our likeness. . . . So God created man in his own image; in the image of God created he him."—*Genesis*, chap. i. ver. 26, 27.

archetypal idea; *secondly*, from the intuitions of man as a conscient realisation of the idea; and *thirdly*, deductively, from *à priori* conclusions as to the teleiotic *contenta* of the idea. As to the *contenta*, it is obvious that the fundamental idea would energise to realise a phenomenal development of itself (162); as to the intuitions, they would correspond to the realisation in thought of those *contenta;* as to the natural history of man, the realisation would be proved by a differential estimate of man as compared with other animals. Now, the fundamental idea of the Divine Mind, considered as a scheme of creation, cannot be comprehended by man, except in so far as it is realised in him. He can know nothing by observation of the universe in which the scheme is realised, except in so far as his powers permit, which are finite both as to time, space, and energy. The ends aimed at in his own creation are more within his grasp. They are his characteristics as an animal, and appear to be—1. The faculty of knowing God as the source of power and order. 2. The faculty of knowing the order of creation—that is, of the laws of God. 3. The power of subjecting those laws to his ends—or in other words, exercising dominion over nature.

187. The intuitions of man, we have already seen, are necessarily in relation with the ideas of the Divine Mind; that is to say, with the ends aimed at and attained (146). The most fundamental of these is the idea of Cause, or energy to ends, and which, in the moral nature of man, is the idea of a moral cause. Now this is the fundamental intuition of a Deity, or more strictly of a supernatural cause, designing and executing. This is so universal, that there is no *race* of men without some such intuition: "Quæ est enim gens, aut quod genus hominum, quod non habeat sine doctrina anticipationem

quandam deorum? quam appellat προληψιν Epicurus, id est, anteceptam animo rei quandam informationem, sine qua nec intelligi quidpiam, nec quæri, nec disputari potest. Cujus rationis vim atque utilitatem ex illo cœlesti Epicuri *de regulo et judicio* volumine accepimus."*

188. That man is the realisation of a Divine Archetype, seems also to have been the orthodox teaching of ancient philosophy. The sentiments expressed by Aratus in the introduction to a scientific astronomical poem, entitled *on Phenomena*, and giving the kosmos as known to the Greeks, indicate conclusively the conceptions which the learned ancients had formed of God. He observes, "With Zeus we must begin—the Ineffable—nor from him rove. Full of Zeus are all the towns and marts of man; full the ocean and ports;—we all are ever in communion with Zeus, for we are of the *genus* of him." In the hymn of Cleanthes a similar expression occurs,—"For we are of the genus of him: the echo and image of the Eternal One"—Ἐκ σοῦ γὰρ γένος ἐσμέν, ἦχου μίμημα λαχόντες μοῦνοι. Considered from this point of view, the opening invocation of our Lord's form of prayer is pregnant with meaning: "But when ye pray, say, ΠΑΤΕΡ ἡμῶν ὁ ἐν τοῖς ουρανοῖς"—'Father of us! who art in the heavens.' That this was the opinion of the educated classes of the ancient world is deducible from the following passage in a work, *De Mundo*, supposed to be of the era of Aristotle:—"It is an ancient opinion or tradition, that hath been conveyed down to all men from their progenitors, that all things are from God, and consist by him; and that no nature is sufficient to preserve itself, if left alone, and devoid of the Divine assistance and influence."†

* Cicero. *De Natura Deorum*, lib. i. § 16.

† *The True Intellectual System of the Universe*, book i. chap. 4.

189. Knowing that such doctrines were current in Greece, we can readily understand how it was that the learned and philosophical apostle St Paul made them available in argument with the philosophical Greeks, by showing that they agreed with Christian doctrines. In his discourse at Athens he taught that the phenomena of life, and motion, and thought, depend directly upon God; thus adopting the doctrine of the Platonists, that the Deity is both a regulative and constitutive principle. For it must be observed, that the words "For in Him we live and move, and have our being," are not a scientifically accurate rendering of the original; the word ἐσμεν meaning rather, We have conscious being. Nor did he limit himself to this simple statement; for he adds an explanation of this participation in the Divine nature which would be perfectly intelligible to the learned Athenians, by quoting from the astronomical poem of Aratus the words, τοῦ γὰρ καὶ γένος ἐσμέν, translated "For we are His offspring." Now, that the word "offspring" is not the counterpart of the word γένος as used by the Greek philosophers, is clear from its use by Aristotle (see below, 270, p. 373), and consequently does not give the true force of the argument. Philosophically, the word implied similarity of form and nature, determined by an idea or archetype, as a cause; and hence, as used by St Paul, it implied both a community of causal archetype between man and God, and a generic likeness of man to God as to mental characteristics. The true cause of his existence is in the Idea, or as it was termed, the "Intelligible." St Paul, therefore, justly added the logical conclusion that since we have our existence causally in God as the Creative Idea, we ought not to consider the Divine to be like gold, or silver, or stone, the graven product of man's art and skill.

190. Now this doctrine of Mind, as the first cause, has not hitherto, I believe, had a true deductive and inductive application to phenomena. It has either been wholly neglected for theological speculations into the nature of God, or secondary causes have been substituted for it in physics, and the inquirer has simply sought to deduce *à priori* deductions from it as to the Good, the Beautiful, the True, &c. An early illustration of this is to be found in Plato. Socrates in the *Phœdo* (§ 108), is represented as referring to this doctrine thus: "Hearing a person read out of a book, written, as he said, by Anaxagoras, and which affirmed that Mind was the order and cause of all things, νοῦς ἐστιν ὁ διακοσμῶν τε καὶ παντων αἴτιος, I was delighted with this cause, concluding that there was nothing more certain, and that the regulating Intelligence orders all things, and disposes each in such way as shall be best for it," &c. But Socrates goes on to say that he found no such *à priori* deductions applied to the explanation of the phenomena of creation and of thought; on the contrary, he found Anaxagoras made no use of this Intelligence as a cause, but made the causes to consist of air, æther, water, and many other things equally absurd. Descartes, in modern times, fell into the same kind of error; for having made all things dependent on motion, and God the cause of that, he wholly lost sight of Intelligence as the first cause, and attributed all the phenomena of creation to "vortices."

191. Those who have limited the doctrine of Mind as a first cause to theological speculations, have discussed the nature of the Deity according to two leading ideas. According to the one, He is the Supreme Orderer of creation according to fixed laws—*i.e.*, a regulative principle, but not in creation as part of it. According to the other, the Deity is Himself an essential element of all phe-

nomena as their immanent and ever-operating Cause—*i.e.*, a constitutive principle. The one idea corresponds to a *Theos*, the other to a *Pantheos*. Either of these notions, if taken separately, leads away from the Christian doctrine of the personality of God. For the idea of a *Pantheos* implies that all things participate in the Divine Nature, and that, therefore, as a cause, God is everywhere; the idea of a *Theos*, omitting this causal nature of Mind, substitutes an inevitable order in the place of Divine Providence as a regulative principle, naming it "Fate," "Necessity," and the like. This negatives the idea of a God at all (Atheism).

192. It will be useful to examine these doctrines with a view to the better comprehension of Mind as a cause; for in this, as in other antagonisms of thought, the truth lies in the union in Relation of the two ideas—*i.e.*, in the conception of God as both a constitutive and regulative principle. Either, taken separately, affords an insufficient explanation of the phenomena of creation, and of the intuitions of the human mind. Atheism, in the strict sense, is the most difficult of opinions to reach and to hold; and is only reached, in fact, by a sort of revulsion against imperfect theories of the Divine Nature. The most common theory of this kind is that which represents God as if He were an artificer, an anthropomorphic workman—of surpassing skill, it is true, but still a workman. Now, it is a thorough knowledge of the law of design in creation, and of the causal character of Ideas, which is the proper antidote to Atheism thus arising. A law of design, rightly understood, can never take the place of the designer; but such a law is needed for the demonstration of his existence. Hence Cudworth advocated the theory of a "plastic nature," devoid of express knowledge and understanding, as subordinate to the Deity, intending thereby

to explain the phenomena of creation, chiefly in the way of confutation of the Cosmo-plastic and Hylo-zoic Atheisms. But, he adds, "Though we had a further design herein also for the defence of Theism, forasmuch as without such a nature either God must be supposed to do all things in the world immediately, and to form every gnat and fly, as it were, with His own hands, which seemeth not so becoming of Him, and would render His providence, to human apprehension, laborious and distractive; or else, the whole system of this corporeal universe must result only from fortuitous mechanisms, without the direction of any mind—which hypothesis, once admitted, would unquestionably, by degrees, supplant and undermine all Theism.*

193. This "plastic nature" of that distinguished philosopher is nothing more than a formularised development of what is included in the simple term "nature" by all writers (71). It is the cognition of the fixed order, according to design as cause, which is seen in creation. Thus Cicero has the phrase "*rerum natura*" for the universe, and "*artifex ipsius mundi* natura" for God. So also Seneca, "*Nihil aliud est natura quam Deus* et divina quædam ratio, toti mundo et partibus ejus inserta." The law of design is thus put for the source of the order or design. Cicero marks the sense in which it was used in his day: "Alii Naturam censent esse vim quandam sine ratione, cientem motus in corporibus necessarios; alii autem vim participem ordinis, tanquam viâ progredientem." And again, "Sunt qui omnia naturæ nomine appellent, ut Epicurus, sed nos, cum dicimus, ut glebam, aut fragmentum lapidis, aut aliquid ejus modi, nulla cohærendi natura; sed ut arborem, et animalia, in quibus nulla temeritas, sed ordo apparet et

* *Intellectual System of the Universe.* Preface.

artis quædam similitudo."* Here the idea is teleological, being limited to the order to ends seen in organisms.

194. This is almost the exact meaning of the word "nature," as applied by modern writers to instinct and instinctive action (72–75). Hence, Nature, it is said by writers, "teaches," "causes," "performs," "builds up," and the like, in all the phenomena of life and organisation. Thus Stewart, supporting Reid's doctrine of the instinctive character of all our actions, remarks: "In this point of view, what can be more philosophical, as well as beautiful, than the words of Mr Ferguson, that 'natural affection springs up in the soul of the mother, as the milk in her breast to furnish nourishment to her child.'† 'The effect is here to the race,' as the same author has excellently observed, 'what the vital motion of the heart is to the individual—too necessary to the preservation of *nature's works* to be entrusted to the precarious will or intention of those concerned.'"‡ *Nature* is put for the order of things termed Life and Organisation. Thus Dr Reid:—"We find it impossible to doubt of things of which we are conscious. The *constitution of our nature* forces this belief upon us irresistibly."§ Reid, supporting the doctrine of *natural* language of the thoughts and feelings as one of his first principles—namely, "that certain features of the countenance, sounds of the voice, and gestures of the body, indicate certain thoughts and dispositions of the mind"—remarks, "For these reasons, I conceive that it must be granted, not only that there is

* *De Nat. Deor.* lib. ii. chap. xxxii.

† *Principles of Moral and Political Science.*

‡ *Life of Reid, apud* Sir W. Hamilton's edition of "Reid's Works," p. 23.

§ *Op. cit.* p. 463,

a connection *established by nature* between certain signs in the countenance, voice, and gesture, and the thoughts and passions of the mind, but also that, by our *constitution*, we understand the meaning of those signs, and from the sign conclude the existence of the thing signified."*

195. The persistence with which this fundamental teleological idea of the order of creation has commingled with fundamental ideas as to the Creator, is well worthy a passing notice. The word τέλος, the root of teleology, or the science of Ends, gives origin, as we have seen (p. 108), in Greek, to τελλω, *facio, fio, orior*, and τελεθω, *sum, fio, orior*, words connoting creative power and intelligence. But (as used by Greek writers) in its seondary meanings, τελος also denoted ideas connected with religion and morals. Thus it was used to mark reward and punishment, executive dignity, and religious mysteries. It is not improbable that τελος itself is derived from some obsolete Sanscrit or Arabic root. Such a root is found in the Hebrew term for God—*El* or *El-oah*, plural *Elohim;* Arabic, *Allah*, and in the derivatives *Eli*, *Elias* (my God); Greek, Ἠλιας. And as the sun or fire was an ancient object of reverence (106), the same word may have been the root of ἥλιος, the sun, and ἕλη, the sun's heat—a word which is probably the root of the Latin *Ele-ment-um* (see *ante* 130), and which enters into *proles*, *adolescens*, and other similar words, expressing the ideas of generation and growth.†

196. The conception of the Deity as a constitutive principle simply, and not as a regulative principle, must necessarily lead on to Pantheism; because, setting aside

* *Life of Reid, apud* Sir W. Hamilton's edition of "Reid's Works," p. 450.

† See Professor Whewell's Discussion of this in *History of Scientific Ideas*, 3d edit. vol. ii. p. 4.

His laws as causal ideas, it implies the direct participation of all things in the nature of God; and any theory of etiological or causal ideas which implies this direct participation, must have the same effect upon men's minds, as to the personality of the Supreme Being, which "pure Puntheism" produces. To avoid this result, it is necessary to consider Mind as a constitutive and ordering force, derived from God, and as that by which He manifests His Will. The force of gravity is, in fact, conceived to be just such a regulative and constitutive principle. Essential to all things, it is participated in by all things. The mind has no difficulty in entertaining the idea, nor in comprehending the cosmic and organic results of its operation—namely, solar systems, or many organised individuals constituting The ONE in regulated relation. So it is with mental force. Everywhere present as a constitutive and a regulative principle, it is participated in by all things; and yet the result is individual, self-conscious organisms. Such we can affirm to be the ultimate law; and it is, in fact, no more difficult of apprehension than was the Newtonian theory of gravity when first propounded.*

197. But a form of speculative theology has prevailed very extensively, in which the two principles have both their mythological representatives. The regulative principle is made to appear as a deity without activity—Thought latent; the constitutive principle, as Deity active. Or the Deity has been represented as alternately active and dormant. These views have had their origin in Asia, where perhaps the most subtle and the most

* Compare J. S. Mill (*System of Logic*, 4th edit. vol. i. pp. 468 *sqq.*) for instances of disbelief in the antipodes, rejection of the theory of gravitation, &c., from the influence of preconceived notions as to the conceivable.

ancient speculations have been developed. The following hymn from the Vedas gives an idea of the speculative powers of the ancient Hindoo philosophers as to the origin and nature of God, and of His working in creation :—

"Then there was no entity nor non-entity;
No world, nor sky, nor aught above it;
Nothing anywhere. . . .
Death was not,
Nor then was Immortality,
Nor distinction of the day or night;
But THAT [*i.e.*, God] breathed without affliation.
Who knows, and shall declare, whence and why
This creation took place?
The gods are subsequent to the production of this world;
Who then can know whence it proceeded,
Or whence this varied world uprose?
He who in the highest heaven is ruler knows, indeed,
But not another can possess this knowledge."*

198. The doctrine of the personality of the Deity has a double foundation on the experience and the intuitions of mankind. Every man feels, amidst all the multifarious processes of his corporeal frame, that he is one, or a person, knowing the past and present, and anticipating the future—desiring, feeling, suffering. He is all this in virtue of the laws of his existence, and eminently in virtue of the great law of adaptation to ends. Now, it is not conceivable that man should be thus personal and conscious, and his Creator (whose existence, by the terms of the argument, is admitted) should be impersonal and unconscious. It would be as easy to conceive that the cause is not equal to the effect; that the less is greater than the whole; that the contained is larger than the container. Further, all men, at all advanced in thought,

* Hymn from the Vedas, *Colebrook's Essays*, pp. 17, 18. See also this Hymn discussed in Professor Müller's *History of Sanskrit Literature*, pp. 559–64.

have some intuitive conviction, however erroneously it may be developed, of a personal agent, external to themselves but operative in nature, and influencing through natural phenomena their weal and woe. As man rises above Fetishism and Nature-worship, the intuition acquires clearness, and at last becomes the innate conviction of a superintending Providence and a personal God.

199. It is not conceivable that these ideas could arise in the mind of man as solitary exceptions amidst the other intuitive truths of his nature; the more especially, when it is demonstrated that it is in virtue of a Providence, or design, creation exists as it is. Cudworth observes that this innate assurance of God's personal existence, called a vaticination of Divine sagacity by Plato and Aristotle, is *Faith* in the Scripture sense. "For the Scripture faith is not a mere believing of historical things, and upon inartificial arguments or testimonies only, but a certain higher and divine power in the soul, that peculiarly correspondeth with the Deity. Notwithstanding which, knowledge or science added to this faith, according to the Scripture advice, will make it the more firm and stedfast, and the better able to resist those assaults of sophistical reasonings that shall be made against it."*

200. Since I shall shortly have to search for the intuitions of the human mind in those of the Divine Thought in creation, as a department of teleological inquiry, I cannot do better than show how closely theological speculations tread upon the conclusions of science by quoting the following eloquent passage from a polemical work by an eminent living theologian,† and sub-

* *Loc. cit.* p. 64.

† *Faith in God and Modern Atheism compared*, by Jas. Buchanan, D.D.

join for comparison a similar passage from a recent philosophical work of Agassiz. "If it be true," Dr Buchanan remarks, "that Mind invests nature with its own forms, is it not also true that there is something in nature that corresponds with human thought?—

> . . . . . 'What if earth
> Be but the shadow of heaven, and things therein
> Each to other like, more than on earth is thought?'
>
> MILTON.

And when man looks at nature, and beholds there, reflected like a mirror, the ideas of his own Reason;—when he discovers in that outer tablet of creation a visible transcript of the same intelligence of which he is conscious within;—when he finds that it has a meaning, and that its meaning becomes intelligible only in the light of his own mental laws;—that he is dissatisfied until this meaning is discovered, and rests on it with entire acquiescence as soon as it is clearly discovered;—when he finds such a harmony between his own mind and the universe as qualifies him to become its interpreter, and such an analogy between what he knows within and what he sees without as enables him to discover indications of the same *Thought* in nature of which he is conscious in his own heart. . . . How can he fail to believe that that nature, which is so faithful a mirror of human thought, is also a symbol of the Divine; and that he is called not only to be an interpreter of its meaning, but a minister also of that august Temple which God has reared for His own worship and glory?" "To me it appears indisputable," remarks M. Agassiz, in reference to zoological systems,* "that this order and arrangement of our studies are based upon the natural primitive relations of animal life,—those systems, to

* *An Essay on Classification* (1859), p. 9.

which we have given the names of the great leaders of our science who first proposed them, being in truth but translations into human language of the thoughts of the Creator. And if this is indeed so, do we not find in this adaptability of the human intellect to the facts of creation, by which we become instinctively, and as I have said unconsciously, the translators of the thoughts of God, the most conclusive proof of our affinity with the Divine Mind? And is not this intellectual and spiritual connection with the Almighty worthy of our deepest consideration? If there is any truth in the belief that man is made in the image of God, it is surely not amiss for the philosopher to endeavour, by the study of his own mental operations, to approximate the workings of the Divine Reason, learning from the nature of his own mind better to understand the Infinite Intellect from which it is derived. Such a suggestion may at first sight appear irreverent. But who is the truly humble? He who, penetrating into the secrets of creation, arranges them under a formula, which he proudly calls his scientific system; or he who, in the same pursuit, recognises his glorious affinity with the Creator, and, in deepest gratitude for so sublime a birthright, strives to be the faithful interpreter of that Divine Intellect with whom he is permitted, nay, with whom he is intended, according to the laws of his being, to enter into communion?"

201. As one more illustration of many that might be adduced, in favour of the assertion that all thinking men in all ages have been led to the same conclusion on this point, I subjoin the following passage from Epictetus for comparison with the preceding. It also shows that the doctrine here expressed may, in the religious man, be a source of religious feeling and consolation:—Why may not he who understands the administration of the

world, and has learned that the greatest, and most principal and comprehensive of all things, is this system composed of Men and God; and that from Him the seeds of Being are descended—not only to my father and grandfather, but to all things that are produced and born on earth, and especially to rational natures, as they alone are qualified to partake of a communion with the Deity, being connected with him by reason,—why may not such an one call himself a citizen of the world? why not a son of God? and why should he fear anything that happens among men? Shall kindred to Cæsar, or any other of the great at Rome, enable a man to live secure, above contempt, and void of all fear whatever; and shall not the having God for our Maker, and Father, and Guardian, free us from griefs and terrors?"* Thus the conclusions of the philosopher, the theologian, and the physiologist, point alike to the Godlikeness of man, and to God as the true Cause of all law and order. This is sufficient for the man of science, who has to inquire into the order and laws of nature, and their causes. But there he arrests his researches: he does not venture to discuss the Divine nature, because it is demonstrably beyond his inquiries. Nevertheless, when Science holds forth her light, he may be permitted the attempt to read more distinctly the laws of human thought, as reflected in that glorious mirror on which are reflected also the ideas and ends of a creating and upholding Providence. Nor is it beyond the sphere of science to recognise and discuss the foundations of the moral world—namely, a grand beneficent Thought in creation, operating according to a law of necessary adaptation to ends. Such inquiries can only elevate the thoughts of the man who engages in them, and, above all, excite deeply grateful feelings that

* Epictetus, book i. chap. ix.

he is permitted thus to examine into and comprehend something of the mighty working of Him who is "ALL *in* ALL," and to be a co-worker with Him in applying the knowledge thus attained in carrying out the beneficent schemes of His divine providence. Nor will those feelings be less tender or reverential, if to them be added the ennobling conviction of his Reason, as well as of his Faith, that God is his Father, and that in Him, in very truth, at every moment of his life, he lives, and moves, and has conscious existence.

DIVISION II.

BIOLOGY.

We have now to apply the teleological doctrine of Causal Ideas to the phenomena of Life and Organisation, so as to develop the great correlations of Life and Consciousness with the laws of the Physical Forces. The subject admits of division under the three following heads: — 1. The fundamental conditions under which Existence is possible according to a law of design. These will necessarily constitute the "categories" of Thought, and also the correlatives of those ideas which lie at the root of all science, as *space*, *time*, *number*. 2. The fundamental laws of vital processes by which Existence is begun and continued, and which must correlate the intuitive or fundamental ideas of Reason, and the fundamental processes of Consciousness. These are the vital energies manifested teleologically. 3. The fundamental laws of Force, or the general doctrines of Morphology, which must also be correlative with the fundamental or intuitive ideas of Form and Function, whether in nature, science, or art. These are the laws of Development manifested teleologically. The unity of the corporeal and mental states of Existence, as manifested in the laws of Consciousness or Thought, will be discussed separately.

CHAPTER IX.

THE FUNDAMENTAL CONDITIONS OF EXISTENCE CONSIDERED TELEOLOGICALLY.

202. There are five conditions which are necessary to existence—viz., Cause, matter, space, time, change. The conscious states which correlate these conditions are intuitive and fundamental ideas, and are evolved by experience into clear conceptions. So that man, upon reflection, finds Mind can only manifest itself in existence as it acts upon matter; without matter, there can be no manifestation of mind (140). He finds, too, that there can be no matter without space; and that as change in matter is the result and sole evidence of the operation of Mind, and change can only occur in sequence, that is, in time, both space and time are as necessary conditions to existence as matter and mind. These, consequently, are also the necessary conditions of mental action, or action to ends, and underlie, therefore, equally the general laws of the mental and the physical forces. For since the first and most necessary result of the exercise of force to end is motion (141), this law of motion correlates all the forces of creation, and all the changes which constitute the phenomena of things. Without matter, no change; without change, no phenomena; without motion, no change; without force, no motion; without mind, no force. Mind is therefore the final cause of all phenomena, but only in correlation with matter, forces, motions, and changes to ends.

203. Now, hypotheses have varied as to the thing moved, or, in other words, as to the application of force. On the one hand, the properties of matter are assumed to be due to the active dynamic or motor relations of its individual molecules or *atoms* to each other—the atomic theory (119); on the other, there is the more popular hypothesis of a *vis inertiæ*, or inert force inherent in all masses of matter, and which is acted on by the *vis viva*, or force proper. This has its most general application in the so-called "first law of motion."

204. The earliest hypothesis elaborated by reason in opposition to experience was the atomic. Cudworth, speaking of it, says, that it "seems to have had its rise and origin from the strength of Reason, exerting its own inward active power and vigour, and thereby bearing itself up against the prejudices of Sense, and at length prevailing over them after this manner. The ancients, *considering and revolving the ideas of their own minds*, found that they had a clear and distinct conception of two things, as the general heads and principles of whatsoever was in the universe; the one whereof was passive matter, and the other active power, vigour, and virtue. To the latter of which belongs both cogitation and the power of moving matter, whether by express consciousness or no. Both which together may be called by one general name of Life; so that they made these two general heads of Being or Entity—passive matter or bulk, and self-activity or life. Moreover, when they further considered the first of these, the material or corporeal principle, they being not able clearly to conceive anything else in it besides magnitude, figure, site, motion or rest, which are all several modes of extended bulk, concluded therefore, according to reason, that there was really nothing else existing in bodies without, besides various com-

plexions and conjugations of those simple elements—that is, nothing but mechanism. Whence it necessarily followed, that whatsoever else was supposed to be in bodies, was indeed nothing but our modes of sensation, or the fancies and passions in us, begotten from them, mistaken for things really existing without us."*

205. The ideas of cause (*i.e.* mind) and substance were at the foundation of all the most consistent hypotheses of the ancients. Thus Seneca speaks of the Stoics, "Dicunt Stoici nostri, duo esse in rerum natura, ex quibus omnia fiant, causam et materiam. Materia jacet iners, res ad omnia parata, cessatura si nemo moveat. Causa autem—id est ratio—materiam format, et quocumque vult versat, ex illa varia opera producit."† And the Reason necessarily reaches the same conclusion in modern times, inasmuch as the current notions are teleiotic truths. Whether we speak of substance, matter, or *vis inertiæ*, of atoms, or of centres of molecular forces, the idea of a force to be overcome, and of a force that designedly overcomes, correlates all our ideas as to the forces of nature, physical, chemical, vital, or mental, and may therefore be considered to be primary teleiotic ideas, or fundamental intuitions (163).‡ Such are the ideas referred to by Cudworth, upon which the ancient philosophers founded their theories, and which Philosophy in all times must necessarily adopt as the primary elements of our cognitions as to matter and its phenomena. The idea, it is true, may not be clearly perceived, and its application to the phenomena of nature may be imperfect;

* *The True Intellectual System*, &c., book i. chap. i. § xxvii.

† *Epistolæ*, 65.

‡ For an able examination of Locke's denial of the idea of Substance, see Dr Whewell's *History of Scientific Ideas* (3d edit. 1858), vol. ii. p. 31.

nevertheless it remains as a fundamental intuition. Expressed as above, although it correlates all the theories of the ultimate constitution of matter, it more especially coincides with that of Boscovitch, that all bodies may be considered as consisting of a combination of mathematical centres, from which emanate forces that at certain distances are attractive forces, at certain other distances repulsive, and at greater distances attractive again; but always according to laws which may be expressed—like the law of gravity—numerically or mathematically. Dr Whewell expresses an opinion that it may be so conceived as possibly to involve an explanation of all the powers which their parts exert (such powers, namely, as those which produce optical, thermotical, and chemical phenomena); but this theory cannot supply an explanation of the mechanical properties of a body as a whole, especially of its *inertia*. A collection of mere centres of force can have no *inertia*.* Now, we have seen that matter only implies something which resists force—what else can this be but force? That which we call *inertia*, as to terrestrial things, only seems to be the force of attraction. It is not difficult, therefore, to conceive that as the force exercised varies as to attraction and repulsion in the combined mathematical centres amongst themselves, so the sum of the forces in combination, as in a gas, or a crystal, or a stone, may vary as to *inertia*, weight, elasticity, and the like. Dr Whewell's examination of the current atomic theories is very instructive, more especially as indicating the various forms which a fundamental idea will assume (118).

206. It must, however, be carefully remembered, that "matter" is a term also used to designate the cause of certain changes in our states of consciousness (2), which

* *Op. et loc. cit.* p. 59.

changes are due, as we have seen, to the action of the physical forces upon those tissues in and by which the organism is developed into a conscious state of existence. It therefore designates, thus used, both the hypothetical subtratum or substance, and the causes of motion—*i.e.*, the forces which operate within it. Hence, when used in this sense (and it is the most important of all its uses), the term "matter" is synonymous with its forces, and not with inert substance.

207. Although the phenomena of creation are necessarily dependent upon incessant change, things are seen to be permanent. Hence, permanence and incessant change are two conditions of Existence. The permanence is hypothetically attributed to the substratum within which the forces induce continual changes or motions to ends. The more consistent theory is, that it is due to the permanence of the *cause* of the changes; for without it there would be no phenomena at all. That final cause is Mind (149). Without incessant change there would be no phenomena; without Mind no change. Hence, Mind is the only permanent thing in creation.

208. We can now comprehend better the fundamental conditions of Existence. Motion necessarily implies space, in which it occurs; and change implies succession of phenomena, and therefore time, in which the successive changes take place. Motion also implies relation of two things, and therefore co-existence in time and space. Hence succession and co-existence are the fundamental conditions of phenomena (that is, of changes) in time and space.

209. Further, motion in space implies a thing moving and moved through space in time, and passing therefore through portions of it. These portions represent *units* of time and space; their combination of one or more

into unity is a *number* of units. The time passed through is marked by the results of the action of force—namely, motion in or through space. The fundamental conditions for the operation of Mind as a regulative force are therefore Force, Substance, or Matter (=force + "substance"), Time and Space. The fundamental condition for the conscient cognition of the results of Mind, or the knowledge of phenomena, is the intuition of Number (167).

210. These conditions of all Thought and Existence are only conceived, logically, as the necessary antecedents of Mind considered as the created cause, not as the creative. Of Mind as the self-existent and creative cause, we can necessarily form no conception whatever; for if we were to say that space and time were its necessary antecedents, they would be its causes, and it would be circumscribed within space and time. All we can say is, that we have an intuition of the Infinite as to cause, space, and time. And this intuition correlates our notion of the Self-existent. How the Infinite and Self-existent can be, is not conceivable by us, inasmuch as, by the very law of our existence, our knowledge is restricted to the Finite—that is, to changes caused by, and restricted to, portions of the Infinite. We are capable of the intuition that there is a self-existent, absolute, intelligent Being, in relation with all things (90, 91). We term Him the First Cause (chap. viii.); but all the fundamental ideas we have of His attributes are actually and logically illimitable. We cannot conceive Him finite in time; because, ascend as we will into the past, we cannot conceive His beginning. We cannot conceive Him finite in space; because, put limits to space as we will, so as to define His presence, we do but draw lines in unlimited space. We cannot conceive Him limited in power; for to limit the forces of creation, is to limit Him. Nor, count the ages as we

will, can we ever conceive that system of worlds to terminate which is upheld by His continual power, or date the period of its beginning. Finally, we cannot conceive Him finite in the power to design, for that would be to conceive limits to His creative energy.

211. It is as well to observe here, that the argument is equally valid with those who would substitute notions of "necessity," "fate," "nature," or "matter," for the intuition of a Divine Intelligence as the first cause, or true Absolute. Time, space, and eternal successions of events from age to age, in a fixed order, without beginning and without end, or that which men call *Cause*, would still be necessary conditions of Existence, and fundamental ideas of our conceptions of any one of these substitutes. Nor would even that which we call *Design* be wanting; for a fixed, unchangeable series of events is what men call Order and Good; and the quality of infinity would still belong to these ideas. On the other hand, the derivative, contingent, or particular ideas and truths are all conceivable, in so far as they are limited to derivative, contingent, and particular things. Thus the ideas of mind, force, substance, unity, duality, antagonism, plurality, permanence, change, and the like, as applied to finite things, are all conceivable. They express, indeed, *phenomena*—that is, what can be felt, seen, observed, and numbered or measured, in time and space, and which are due to an intelligent cause; nevertheless, without these conditions, we cannot conceive them to exist.

212. When, therefore, we consider the beginning of things, it is only the beginning as conceivable by a finite mind. Now, it is this Beginning which we term the Creation, and which has occupied so deeply, in all ages, the thoughts of men. Various theories of cosmogony,

as of theology, have been developed; they have all, however, as their basis, the fundamental intuition that Mind is the first cause. But, inasmuch as order correlates design, Mind, in cosmogony, is considered as the first cause of order; for if there was need of a design at any period, the necessity could only arise from the absence of order. Hence substance (or inert matter), space, and time, being considered as the necessary antecedents to the present order of things, they are of necessity the conditions of antecedent *dis*order. Now, this hypothetical pre-existent state of disorder is termed *Chaos*, and the subsequent state of order is termed *Kosmos*. The term *creation* (Latin *creo*) has its root in the old Greek word χρέω or χράω, the primary meanings of which had reference to the communication of Divine knowledge and power. Hence it specially applied to oracles. Its derivative, χρῆμα, indicated the results of force exercised by mind to ends—*res, negotium, factum, opus*, as well as *oraculum*. The most intelligible theories of cosmogony have always started with Mind as the first ordering cause, and its antecedents, viz. substance, without force or order, and space. The doctrine of Anaxagoras seems to have been the most clearly expressed. It is affirmed by Diogenes Lærtius, that he was the first who considered Mind as well as Matter to be a primary, independent principle, commencing his work with the general proposition, "All things were without change, or the same; then Mind coming, arranged them [into worlds]"—Παντα χρηματα ην ὁμου, ειτα νους ελθων αυτα διεκοσμησε. He affirmed, also, that Mind is the cause of motion—Νουν μεν αρχην κινησεως. Ovid has briefly expressed the opinions of at least some of the learned Romans of his time, and which were to the effect that there was a Chaos in the beginning, in which there was neither

order nor harmony, and matter was one inert or motionless mass:—

> "Ante mare et terras, et, quod tegit omnia, cœlum,
> Unus erat toto naturæ vultus in orbe,
> Quem dixere Chaos; rudis indigestaque moles,
> Nec quicquam nisi pondus iners; congestaque eodem
> Non bene junctarum discordia semina rerum."

213. The Mosaic cosmogony is based on the same ideas. First, God is represented as creating "the substance of the heavens and the earth," for this is the true translation, the original and important particle את, *Eth*, not being rendered in the common translation. This particle, composed of the first and last letters of the Hebrew alphabet, was used to express the sum and substance of all things.* The substance thus created was, however, inert, so far as the earth is referred to; for it is described as being without form and void, while darkness was on the face of the abyss. The next step in causation was *light*, or the cause of order; for God said, "Let there be light," and order began. Now the word translated "light" has other meanings elsewhere in the Bible. Thus, in Isaiah xxxi. 9, and Ezekiel v. 2, it means fire; in Isaiah xliv. 16, it means the heat or warmth derived from the fire; in Job xxxvii. 3, it means lightning, or the electric fluid; and in Job xxxi. 26, it means the sun as an object of worship. In all these verses there is the same idea implied; namely, that of force. As the learned Oriental scholar just referred to (Dr Adam Clarke) remarks, the word that would best express the true meaning of the term translated "light" is *heat* or *caloric*. The absence of light, as a characteristic of "Chaos," is not peculiar to the Mosaic cosmogony; other ancient writers make eternal night the antecedent

* Compare Dr A. Clarke's comment on the passage.

to the present order of things; in Greek writers, for example, *chaos* means not only disorder but darkness.

214. It is unnecessary for our purpose to pursue this subject further, for nothing is more unsatisfactory than cosmological speculations, whether indulged in by metaphysicians or geologists. And abundance of arguments, logically unanswerable at least, might be brought against this doctrine of a universal chaos, as precedent to the orderly phenomena of nature. In truth, as we have seen already, we cannot conceive such a state of things consistently with the adoption of the doctrine which teaches the eternal existence of God. The more satisfying hypothesis, at least, is that which makes order to be as universal and boundless, as the Divine Mind upon which it depends is Absolute and Infinite; and although to the Infinite and Eternal we can conceivably set no limits, yet, within the Infinite and Eternal, we can conceive eternal cycles of phenomena. Thus we can conceive the boundless universe undergoing incessant cyclical changes in its constituent elements, so that worlds and systems are successively disintegrated and integrated, and new creations begun in never-ceasing cycles of change. In this way we can see how the nebular hypothesis may help us to a better idea of creation; and we can conceive how that which we term Chaos was the period antecedent to a special integration, according to the Divine laws, of that limited portion of universal matter which is comprised in our solar system.

215. Be this as it may, we cannot come to any other or better practical conclusion, in the present state of our knowledge, than that there are certain conditions necessary to all existence. 1. That the observed existing order of phenomena had a beginning in *time*. 2. That they are due to changes occurring in *space*. 3. That the things

in which the changes occur must be *substance—i.e.*, something circumscribed in space. 4. That the changes or phenomena did not begin of themselves, but were begun by something else, termed *cause ;* and, 5. That that cause is an *ordering power* or force, of which the whole phenomena of creation constitute the continual manifestation. These are the fundamental and necessary conditions of finite existence, and the limits to our cognitions. These, too, are the fundamental conditions of the manifestation of that law of design which is the regulative principle of creation. Without them, therefore, neither Life nor Thought is possible, and no idea can arise in the consciousness. As conditions of Existence and Thought absolute, they are infinite ; but as potential and regulative ideas in Life and Organisation, they are limited in their operation by the fundamental idea of the law of design itself—namely, unity.

CHAPTER X.

LAWS OF PERMANENCE WITH INCESSANT CHANGE IN ORGANISMS.

SECT. I.—*The General Doctrine.*

216. INASMUCH as the operation of the molecular forces of matter upon organisms—that is, of light, heat, electricity, &c., are constantly varying, so, according to the law of adaptation, must both the phenomena of Life and Thought be constantly varying. Hence, while there is continuance of the organism in time and space, or permanence as a whole, as to its parts there is incessant change; in other words, the phenomena of Life and Thought are incessantly changing—are the particular, variable, contingent, in our cognition of Existence. The changes are manifested in two modes: 1. As physiological changes, when they are changes in the ultimate constituents of the organism—*i.e.*, *teleorganic*, molecular, chemical, or histological changes. 2. As morphological changes, when they are manifested in the form of the organism, or of some of its principal parts considered as a whole or wholes. Hence two fundamental procedures are applied to biological phenomena—namely, 1. As they occur in relation to time, BIOLOGY proper; 2. As they occur in relation to space, ORGANIC MORPHOLOGY, of which systematic zoology is the principal department. We will proceed to examine the changes in time in relation with the laws of permanence and incessant change.

217. Time, as we have seen, is a necessary condition of existence. The modes of all phenomena are permanence, succession, and co-existence in time; the relations are simultaneity and succession. Without these there could be no phenomena; for phenomena are simultaneous and successional changes, but changes ever succeeding each other. Should change cease, phenomena cease too. Hence, successional changes are necessary to the fundamental idea of permanence in time and space.*

218. To comprehend better the relations of time to vital actions and to thought, let us revert to their causes. We have seen that Thought precedes phenomena as a causal antecedent; but it is Thought in correlation with Force (147–149). Now, if we hypothetically conceive the moment when creation began to be precisely the moment when Thought energised, such a moment of time would be the first Present; for as there had been no act before it, there could be no past. The act of energy having taken place, phenomena begin; but these are necessarily followed by another act of energy. When that takes place, the time it occupies is the present, and the moment of antecedent energy is now the past moment. But every act of energy, according to a law of design, has an end in view. To act with an end in view, is to act with reference to the future time, or to a moment which is not, but is to be. This idea of Prescience is the fundamental idea, therefore, of the law of design, and as such correlates all acts of energy; or in other words, every vital action takes place presciently—*i.e.*, with reference to the future. What the nature of that action will be, is necessarily determined, however, by the antecedents to it—or its *causes* (152); so that the future is indisso-

* Compare Kant, *Kritik der Rein. Vernunft.* "Of the Permanence of Substance."

lubly linked to the past by the present. While, however, change is incessant in organisms, there is permanence of the *one*—the individual. In man and the higher animals this permanence constitutes personal identity. The present individual is the same man that existed in past time, and that will exist in future time, however changed in form and substance. What, then, is the cause of this permanence or organic unity in the past, present, and future? Obviously, the cause of the phenomena themselves; that alone is the unchanging thing. Now, the cause of the phenomena, as we have established, is Mind, evolved as teleiotic ideas. It is this which is not only the source of the vital forces, but of that linked order of events (150, 151) which constitutes each individual, species, genus, and branch what it is.

219. In cosmic and molecular phenomena, permanence is *stability*. The simplest notion of the general law of incessant change, in correlation with stability, may be obtained by an examination of astronomical phenomena, in which the operations of all the primary forces of matter are also most distinctly shown. If a body at rest be projected into space, it will move on for ever in the same line of projection; that is to say, its direction and velocity will be permanent, unless some other force act upon it, to change its velocity or deflect it from the line of projection. When such a force so acts, as, for example, the force of gravity, every point of space passed through by the body corresponds to a change of direction; so that, taking the earth as an example, there are as many changes in the direction of the earth's motion round the sun, as there are mathematical points in the ellipse which it describes by its motion. These infinitesimally minute and numerous changes are not only compatible with stability, but, by the law of cyclical recurrence of the

changes, and their integration into one, stability is secured. The phenomena, although ever-changing, always occur as a unity in the same order of change, according to the laws of action of the motor forces (132, *note*).

220. Now, the earth has other motions besides this annual motion; there are its diurnal motion on its own axis, and its secular motions in common with the planets, and which are dependent upon their mutual affinities. Changes occur in these motions at long intervals of time (as marked by the precession of the equinoxes), but with the same law of what may be termed *cyclical order*, upon which the law of stability depends. Seeing that stability is the result of incessant cyclical change, we can formularise the law as "the law of cyclical change and stability," and, reasoning from our own experience of our own mental operations, we refer all these changes and their results to a law of adaptation of events to these ends—namely, change and stability (207); which law arises necessarily out of a law of design.

221. Let us now revert to the order of vital phenomena, and examine them in reference to this primordial law of creation. The first circumstance that arrests our attention is, that the antagonism between the vital and physical forces to which vital phenomena are due—that is to say, the law by which the operations of the primary forces of matter are so modified by the action of the forces themselves, as to constitute those secondary series of the phenomena of nature known as the phenomena of life—is identical with that antagonism between the forces of attraction and repulsion, or polarisation, manifested in the heavenly bodies, and upon which the great laws of incessant cyclical changes are dependent. The deflection from the line of motion in space is analogous to the deflection from the order of physical phenomena

manifested in vital phenomena, all which, as we have seen, are as antagonistic to merely physical phenomena, as the eternal motion of a body in a straight line in space is antagonistic to eternal motion of the same body in an ellipse, circle, parabola, or the like. This fundamental law of change in vital phenomena carries with it the other general laws associated with it in physical phenomena; so that the law of incessant cyclical changes, and the law of stability, together with the law of adaptation, to the end that there shall be both incessant change and stability or continuance of the order, are inseparable in the order of vital phenomena. Incessant cyclical change, and therewith stability, is shown in the continued life of individual organisms, and in the continuance of organisms in general (*i.e.*, as species) on the earth. In the individual, the series of cyclical changes end with the reproduction of one or many organisms from the individual as a parent. When this function is performed, the end of existence is attained, and the continuance of the individual is no longer an absolute law of existence. Many organisms perish almost immediately after the reproductive process has been completed; in others its completion is the date from whence commences a decline of vital power, or, in other words, is the period when the tendency to death commences.

222. Mr Paget has shown that incessant chronometric changes in the nutrition of organisms are the cause of measured movements. He is of opinion that, in the vertebrata, the rythmic motion of the heart is due to the time-regulated discharges of nerve-force in certain of the ganglia in and near the substance of the heart, by which discharges the muscular walls are excited to contraction. In invertebrata, the corresponding pulsatile movements of hearts or vessels are probably independent of nerve-force.

The time-regulated action of both the nervous centres and the independent contractile walls is due to their nutrition being rythmic—*i.e.*, to their being raised, in certain periods, to a state of instability of composition by nutritive changes in composition, going on with regulated progress; in their decline from which they discharge nerve-force, or change their shape in contraction. The muscular substance of the heart in the vertebrata has a rythmic nutrition of its own, corresponding and co-ordinate with that of its ganglia.

223. Rythmic nutrition is a process in accordance with the general laws of organic life; very many organic processes being composed of timely-regulated alternate action and inaction, or alternate opposite actions—*i.e.*, they are rythmical, with longer or shorter units of time. And all organic processes being chronometric—*i.e.*, ordered according to laws of time as exact, and only as much influenced by external conditions as are those relating to weight, size, shape, and composition*—the sum of the vital forces of organisms is in relation to time. But each differs from the other in this respect; for that sum is made up of minor periods of time, and those again of lesser periods. The fundamental unit of time is apparently the complex result of two kinds of chronometric forces—namely, 1*st*, The *cosmic* physical forces, acting as causes of terrestrial and meteorological changes, and thus indirectly influencing the development of the vital forces; and, 2*d*, The *biotic* idea of development, which, as it evolves in growth and completion, is manifested by vital changes, marked by their occurrence or recurrence at periods which can be measured.

224. This law of periodicity, as manifested in the

* Mr Paget, "On the Cause of the Rythmic Motion of the Heart," Cromian Lecture, *Phil. Magazine*, vol. xv. (Jan. 1858), p. 70.

phenomena of reproduction, and its applications to the pathology and treatment of the diseases of the nervous system of women, were first pointed out by me in a paper published in 1839,* and more distinctly in 1840.† Subsequently I published a series of papers developing the applications of the law to general physiology and pathology, fixing the fundamental period or unit of time in man.‡ It is worthy of remark that systematic writers and compilers have almost wholly ignored the question.

SECT. II.—*The Laws of Cyclical Changes.*

225. I have already remarked that perhaps the clearest conception we can form of creation is, that it is an infinite whole, made up of parts which are unities, and which are incessantly undergoing cyclical changes. From this point of view, our solar system is one of an infinite number of unities thus alternating in changes (214). This law of cyclical change is manifested in organisms. Some animals and plants complete an entire series of phenomena—a period of life—within a day of twenty-four hours; of this kind are the ephemeral insects, or the night-blowing plants, as the *Victoria regia*. More generally, a series of physiological changes, marked by alternate action and repose, occupy the daily period; and these periods make up a larger period of like alternate action and repose. Such a period is the annual period in many animals, in so far at least as reproduction is concerned, and probably as to other physiological changes.§ The entire year may be said to be the analogue of an entire day. Then, as each

* *Edinburgh Medical and Surgical Journal* (July 1839), p. 43.

† *On the Nervous Diseases of Women*, chap. iii.

‡ *Lancet*, vol. i. (1842–43).

§ See my Papers in the *Lancet*.

revolving year is added to the sum of years of life, the morning of youth advances into the noontide of manhood, and manhood gradually declines into the evening of life, and death at last ends the cycle of changes.

226. The same law is manifested in the great phenomena of the universe. The doctrine of great cosmic cycles of change is of very ancient date, and very general prevalence. The Hindoos hold that the work of creation and dissolution has been continually going on from eternity, in a series of cyclical changes regularly repeated or recurrent. *Brahma*, or God, is represented as in the first place creating all things in their order; and that this creation having been perfected or completed, its series of evolutional changes exists for a definite period, termed a *Kalpa*. The Kalpa is divided into four parts or ages, a thousand times repeated, in the ratio to each other of 4, 3, 2, 1, and comprises the lapse of four thousand two hundred and ninety-four millions of years. At the conclusion of this period a dissolution of the universe occurs. This state of chaos continues for an equally long period of time; which being completed, *Brahma*, or God, begins the work of creation anew, and creates the same things in the same order, to continue for the same period of time; so that whatever events have taken place in the current Kalpa, have taken place in the innumerable Kalpas which have already elapsed.*

227. The ancient Egyptians held a similar doctrine of recurrent cycles. They had a theory of an *Annus magnus* within which there was a complete cycle of mundane phenomena, and which was completed in from 300,000 to 360,000 years. That great year of the universe being ended, and the whole assemblage of celestial phenomena,

* Rev. W. Wrightson. *Sanscrit Hagiographia.*

which are regarded as the influential causes of all changes in the sublunary world, being restored to the same order and proceeding in the same catenation as before, the whole series of events that depend upon them follow in their former connection of time and place. The same individual men are doomed to be born again, and perform the same actions as before. The same arts are to be invented—the same cities built and destroyed. Or, in the words of Virgil, who evidently had this philosophical doctrine in view,

> 'Alter erit tum Tiphys, et altera quæ vehat Argo
> Dilectos heroas: erunt etiam altera bella;
> Atque iterum ad Trojam magnus mittetur Achilles."*

This ancient theory of cosmic cyclical changes seems to be referred to by the author of *Ecclesiastes, or the Preacher*, who applied his heart "to know, and to search, and to seek out wisdom, and the reason of things," when he remarks; "The thing that hath been, it is that which shall be; and that which is done, is that which shall be done; and there is nothing new under the sun. Is there anything whereof it may be said, See, this is new? It hath been already of old time which was before us."†

228. Dr Whewell has expressed an opinion to the effect that these and other ancient theories are to be considered of mythological rather than scientific origin. There can be no reasonable doubt that science, as presented to the popular mind by the most ancient philosophers, had a mythological character given to it; for both science and philosophy were made subservient to priestly domination. And it is probable that this proceeding had a corrupting influence on both. Nothing is more natural, even amongst modern philosophers, than to

* Eclogue iv. † Chap. v.

make marvels, for the time, of scientific discoveries. But there can be no reasonable doubt, that physical science attained a much higher development in these remote ages than the popular expositions of it which have come down to us would lead us to imply. The Chaldeans are said to have used a sol-lunar period of 600 years, the unit of which was a solar year of 365d. 5h. 51m. 35s. 2th., and 7421 lunations of 29d. 12h. 44m. 2s. 48th.* If this be so, the conclusion is obvious as to their scientific acquirements. Nor is it at all certain that the *Annus magnus* of the Egyptians should be placed in the same category as the *Kalpa* of the Hindoos. Such, considered as an astronomical cycle only, and not in its astrological applications, seems to be by no means improbable. The earth's orbit is at present elliptical, but in some far distant age it was circular, and in some remote future age it will be circular again; after this it will again open out into an ellipse, and the eccentricity reach to a moderate amount, when it will again diminish as before. These progressive changes are due to the action of the planets on the earth. The time required for these alternate cycles (Sir F. Herschel states), though calculable, has not been calculated farther than to satisfy us that it is not to be reckoned by hundreds or thousands of years. It is a remarkable coincidence, that the knowledge of this cyclical change was acquired indirectly through ancient Chaldean records of lunar eclipses.

229. The order of geological changes was also known to some extent to the ancient philosophers. This is indicated by the story that Anaximander accurately predicted an earthquake, and warned the Lacedæmonians of

* On "The Ancient Chaldean and Egyptian Chronology," by Isaac Cullimore, Esq., in *The Morning Watch*, a quarterly journal, No. xv. p. 177.

it, who left their city in consequence, and went armed into the plain before it occurred. This and other similar predictions are mentioned by Cicero,* so that we must not rashly conclude from the distorted science and philosophy of poets and others, that the ancients had no true knowledge of either, and that their prediction of geological catastrophes was wholly mythological. They seem, indeed, to have both deduced the law of cyclical change *à priori*, and calculated it from observation of the order of phenomena.

* *De Divinatione.*

CHAPTER XI.

FUNDAMENTAL PRINCIPLES OF MORPHOLOGY, OR THE LAWS OF EXISTENCE IN RELATION TO SPACE.

Sect. I.—*General Doctrines of Forms of Things.*

230. The existence or manifestation of a thing in space (10) is due to the action of its forces on, or in, its substance. These determine the extent of space within which it shall move, or live, or act; or, in other words, its form. Consequently, its form will vary according to the operation of its teleiotic ideas, whether cosmic, chemical, or biotic—that is to say, according to its nature. Hence the truth of Aristotle's dogma, Ἡ μορφὴ φύσις, Nature is Form.

231. All forms have their limits in virtue of the law of Existence in space. Hence the idea of a Limit is fundamental, "the use of which in proving the propositions of the Higher Geometry cannot be superseded by any combination of other hypotheses and definitions."* A straight line corresponds to the first law of motion in space; a curve, to the constant deflection of a body moving in an imaginary straight line, by a deflecting force. And as this double motion is the primary mode of manifestation of force in the phenomena of nature, it follows that the lines which constitute the visible limits of a thing in space are made up of curves. "Every

* Dr Whewell. *Hist. of Scientific Ideas*, 3d edit. vol. i. p. 152.

curve may be considered as the limit of some polygon; and every varied magnitude as the limit of some aggregate of simpler forms; and thus the relations of the elementary figures enable us to advance to the properties of the most complex cases."*

232. The form of a thing is thus defined by the limits of its forces operating in space; or, in other words, the form indicates the extent of operation of the forces which constitute the thing, ONE, *a* thing. Now, these forces are of two kinds, the absolute and the relative; there must therefore be two kinds of forms, the absolute and the relative. For example, the form of a nebula or cluster of stars is determined by the reciprocal influence upon each of the stars which constitute it one thing—a nebula. Retained within each other's force-sphere, the visible outline of the whole is due to the light reflected from the entire group to our organs of vision; it is their absolute visible form as constituting *one* thing, or a nebula. But if we were situate within the limits of the nebula—that is, on one of the stars or suns which compose it—the form would be altogether different. It would be probably found to be that of a concave surface, like our own heavens, studded with the stars which constitute the nebula.

233. The same law applies to all objects of perception by the eye, as a man, a tree, a forest, inasmuch as they are all units of perception made up of a multiplicity of parts (62). The Form Absolute is, like every notion of the absolute, conceivable, but cannot be represented or realised, being infinite. It is the form which the universe must assume, and which, according to the fundamental principle of Kosmic Teleology, must be that of a sphere with its centre everywhere, and its surface

* Dr Whewell. *Hist. of Scientific Ideas*, 3d edit. vol. i. p. 152.

nowhere; for all the parts must be in isodynamical equilibrium, to constitute the absolute and perfect unity implied in our conception of the universe.

234. These statements are applicable more especially, however, to visual form; but form may be determined by touch. In this case, the relation of the points of resistance to each other, or, in other words, a force correlative with light—the force of molecular repulsion—determines the form. Other correlative forces could conceivably act upon each other, and upon the sentient organism, and thereby the limits of a thing be determined. In this way, the limits of the solar system are marked by the sphere of action of the centrifugal and centripetal forces; so also the limits of the system which the earth and moon in dual relation constitute. Hence Dr Macvicar justly argues, that "the forms of objects are their isodynamic boundaries in space," and differ, therefore, as to the forces which operate in it. "The form of an object, when conceived scientifically, is rather an enclosure in space around its centre, which gives or manifests the isodynamic boundary of some property of that thing, as, for instance, its property in relation to light, or impenetrability, electricity, magnetism, &c. It is therefore physically correct to speak of the visible form, the tangible form, the electro-magnetic form, of an object; but to speak of its form without limitation is to use abstract language, which cannot lead to positive science—unless by form generally we mean visible form, as is, indeed, usually the case."*

235. The same idea is involved in theories as to the physical properties of bodies. These properties are nothing else than the results of the action of the bodies

* *First Lines of Science Simplified*, App. "Elements of the Economy of Nature," a Fragment, 2d edit. (1860), p. 27.

upon each other, or upon sentient organisms; and as these results are due to the mutual action of their internal forces, force is the cause of the properties as well as of the form. "The forces by which the particles of a body are held together [and give it its form], also cause it to be hard or soft, heavy or light, opaque or transparent, black or red; for if these forces are not the cause of these peculiarities, what can be the cause? By the very supposition which we make respecting these forces, they include all the relations by which the parts are combined into a whole; and therefore they, and they only, must determine all the attributes of the whole."† Form, thus taken in its widest sense, passes into the illimitable. We cannot, for example, limit the gravitating force of the earth to the moon or to the sun, since it extends to the whole of the planetary system. Nor, in this sense, can we limit the form of the planetary system, taken as a whole, except in its isodynamic relations to other systems. The great law of continuity applies, in short, to form, as to all other things in creation.

236. Form is due to co-existence of phenomena: the form of a thing at any moment is the result of the co-existent forces of the moment. When the successions of co-existent changes are so minute as to be inappreciable, the form is said to be permanent; on the contrary, if the forces are active, and the successions of changes frequent, the form varies accordingly. Permanence and change of form are proportionate, therefore, to the simplicity or complexity of the teleiotic ideas, and of their manifestations in time and space. The cosmic class are the most simple in character; hence there is little change in the form of the great masses of the universe. The chemical teleiotic ideas are manifested by greater variety and changeable-

† Dr Whewell. *Hist. of Scientific Ideas*, 3d edit. vol. ii. p. 26.

ness of form as they approach the biotic; and in the biotic we have the highest degree of both. But there are higher and higher degrees of derivation in the biotic, according as Mind is evolved into conscious activity, until they culminate in Man. In him, the highest beauty is associated with the largest complexity and the most perfect unity. This is seen in both his colour or complexion and his form, including, under man, both sexes.

237. With this higher and higher development, *limitation*, such as is possible and even æsthetic in the cosmic or geometrical forms, becomes more and more difficult. The nobler the materials, says Mr Ruskin, the less their [geometrical] symmetry is endurable. Mr Ruskin shows clearly the importance of knowing that indefinableness in colour is one of the first requisites to beauty in colour. "It is a marvellous thing to me that book after book should appear on this last subject, without, apparently, the slightest consciousness, on the part of the writers, that the first necessity of beauty in colour is gradation, as the first necessity of beauty in line is curvature,—or that the second necessity in line is softness. . . . Unless it loses itself, and melts away towards other colours, as a true line loses itself and melts away towards other lines, Colour has no proper existence, in the noble sense of the word."* It is interesting, too, to note the atomic character of the material. "The final particles of colour necessary to the completeness of a colour's harmony are always infinitely small, either laid by immeasurably subtle touches of the pencil, or produced by portions of the colouring substance, however distributed, which are so absolutely small as to become at the intended distance infinitely so to the eye."†

* *The Two Paths*, by J. Ruskin, M.A., p. 270. (App. v.)

† *Ibid.* p. 271.

238. Crystallography has had its greatest development since the researches of Weiss and Mohs gave greater definiteness to the laws of crystallisation as a process due to force, and showed that all existing forms could be derived from the fundamental forms; that is, were what might be termed *genera* and *species*. Sir David Brewster threw new light upon them when he showed that the geometrical symmetry of crystals corresponds exactly to their optical form. Weiss, seeing that the properties of bodies were determined by forces which acted in them, and not by the *molecules* of which they were composed, developed the idea, and arrived experimentally at the general principle, that amidst all the casual fluctuations in the primitive form of crystals, there were fundamental relations in their dimensions, or what are now called axes of symmetry. "With reference to these axes," he found, as he goes on to say, that 'a multiplicity of internal Oppositions, necessarily and mutually interdependent, are developed in the crystalline mass, each relation having its own Polarity, so that the crystalline character is co-extensive with these Polarities.' "* Morphology, in its widest sense, is therefore based, as a science, upon a knowledge of the correlations of the forces operative in and around things.

SECT. II.—*General Laws of Absolute or Permanent Forms.*

239. In organisms, the law that the visible form is due to the action of the vital forces, considered as causal ideas, is very strikingly manifested. In none (except, perhaps, the simplest) is there true permanence of form; even during the adult life of the individual, changes are continually going on, although slowly and imper-

* Dr Whewell, *op. cit.* vol. ii. p. 84.

ceptibly. Biotic forms are due to two kinds of forces, and hence two kinds of vital forms. The one kind is an "archetypal" form as determined by the plan of construction—the primary formative or archetypal idea—of which it is a derivative form; this is a permanent or immutable form, being due to a universal or fundamental idea. The other kind of form is a particular or individual form, and is physiological; being determined by the contingent and variable vital forces, it is contingent and mutable.

240. The archetypal or absolute forms of plants and animals must necessarily follow the great primary laws of phenomena. First, there is a unity of form in the primordial cell common to all organisms, whether animal or vegetable; this seems to be primarily the sphere or spheroid. As the idea is evolved in various directions, forms vary. Thus plants differ from animals fundamentally in the relative position of their respiratory and nutrient organs; secondarily, in the locomotive power by which the form of animals are so deeply influenced. Animals seem to be formed upon four principal archetypes—according to Cuvier's arrangement—viz., the radiate, mollusc, articulate, and vertebrate; or upon five, if the protozoa be accepted as a distinct branch. But these archetypal ideas, whatever the number of branches, are only archetypal in the sense that they are derivative from a fundamental law of design, and therefore correlate vital forces operating to ends. Now, there are two classes of these archetypal forms: *first*, those which correspond to primary laws; *second*, those which correspond to derivative or secondary laws, in descending, or rather expanding series. The first class of forms would therefore correspond to the fundamental derivative ideas of unity, duality, plurality, and totality, which we shall

have to consider in the next chapter, as the fundamental causal ideas, or laws of the vital processes.

241. *Unity* gives the form of the sphere or spheroid, for in this all the parts are in equal relation to each other, and all in relation to one point—the centre. This, according to a great variety of hypotheses and researches, is the fundamental form of things. It is, in particular, the basis of all the various theories of molecular and physical forces, of crystallisation, chemical affinity, and the like, brought forward of late years (p. 245). The circle was used in ancient India as the symbol of the Divine Generator, for it is as a circle that the visible limits of the sphere are presented to the consciousness. A volume might be written on the derivative ideas which meditation on the sphere and circle has suggested. One instance will suffice to illustrate this. The ancient doctrine of the Beautiful, as it applied to the sphere, is stated by Cicero in a summary of one class of ideas of this kind: "Quid enim pulchrius ea figura, quæ sola omnes alias figuras complexa continet, quæque nihil asperitatis habetur, nihil offensionis potest, nihil incisum angulei, nihil anfractibus, nihil eminens, nihil lacunosum? Quumque duæ formæ præstantes sint, ex solidis globus (sic enim σφαῖραν interpretari placet); ex planis autem circulus aut orbis, qui κύκλος Græcè dicitur; his duobus formis contingit solis, ut omnes earum partes sint inter se simillimæ a medioque tantum absit extremum, quantum idem a summo; quo nihil fieri potest aptius."*

242. *Duality*, as a teleiotic idea, is fundamentally the idea of the One in relation to the One. In its simplest operation in matter, whether as a cosmic or molecular causal idea, it gives the form of the prolate spheroid or ellipse—*i.e.*, the dynamical unity or synthesis of two

* *De Natura Deorum*, lib. ii. chap. xviii.

spheres or spheroids, whose centres are in relative equilibrium. This form correlates the combination of two spherical units in which the periphery of each bisects the centre of the other. It is a form which plays an important part in the theories of the forces into which the idea of dualistic relation enters, as polarity, and the like.

243. *Plurality* and *totality* produce composite forms, the fundamental character of which consists in the union of many spheres or spheroids. Such forms vary greatly according as the primary elements are connected, aggregated, integrated, or coalesced. These are highly evolved derivatives of the fundamental idea, and are therefore the forms of things in which the causal ideas are highly evolved derivatives. They are consequently seen in organisms which are constituted of complex groups of integrated spheres or spheroids, their limits or outlines being made up of areas or segments of the latter. "However striking the difference," Mr Quekett observes, "between an animal and plant may seem at first sight in the higher groups, a more extended examination shows that animals and plants gradually approach each other as we descend in the scale, until they meet in a common centre—the simple and individual cell." And again, "The typical form of cell is either spherical or oval; but by pressure of growth, cells assume almost every variety of shape." *

244. Mr D. R. Hay has developed a geometrical theory of the Beautiful in living forms of singular completeness and simplicity;† of which the fundamental idea is, that the outline is due to the combination of arcs of various ellipses harmonically flowing into each other—*i.e.*, curves

* *Lectures on Histology* (1852), pp. 3, 7.

† *The Science of Beauty, as Developed in Nature, and Applied in Art.* Edin. 1856.

of a composite ellipse. Mr Hay's theory presents that fundamental test of a true theory which unity of doctrine gives; for he shows its applicability to the Beautiful in colour and sound. Or, in other words, the theory is applicable to the determination of the geometric laws of action of the forces by which harmony in colour and sound are produced, as well as harmony in outline or limits (234).

245. The composite physical forms determined under the influence of molecular or chemical teleiotic ideas by the combination of spheres or spheroids, is very admirably illustrated by Dr Macvicar's researches, in whose theory the sphere or spherical shell is the fundamental or primary form. Nothing can surpass the beauty of form which the crystals of bodies theoretically take, when made up of spheres in correlation, according to the laws Dr Macvicar develops.*

246. *Symmetry.*—The forms of organisms being due to the forces energetic within them, and these being in equilibrium with each other and with external forces, Symmetry is the result. Thus dichotomy, with equilibrium of the two halves, leads to lateral symmetry. A repetition of dichotomised and combined units in a bilateral, lineal series, is the form of the Articulata and Vertebrata. In the Radiata the arrangement is circular; in the Molluscs the symmetry is disturbed. Symmetry being due to a repetition of simple forms, or dichotomised units, is perfect only when all the symmetrical members of a natural product are, under like circumstances, alike affected by the natural formative power. "The parts which we have termed *symmetrical* resemble each other, not only in their form and position, but also in the manner in which they are produced by natural causes." This is

* *First Lines of Science simplified* (Edin. 1860), Appendix, part ii. chap. i., "The First Lines of Morphology."

the law determined by observation and experiment.* Further, there may be symmetry in the expansion, or partial or total suppression of units or limbs. Thus the Radiata have for the most part five limbs. If one of these be expanded, or in any way peculiarly modified (as in the *echini*), it is reduced to the type of animals with a symmetrical right and left side. Or if the number be doubled as in the ten-rayed Asterias, and the circle be elongated so that there be five opposite pairs, it is transformed into the type of an articulate animal with two symmetrical halves.

247. Symmetry is determined by Number. The One and the One in dual symmetrical relation, is *binary* symmetry; the Binary and the Binary in dual symmetrical relation, is *quaternary* symmetry. Organic and inorganic symmetry are widely different as to the fundamental forms, although in the lower forms of organisms, as the Diatomaceæ and the Algæ, the inorganic form of binary or quaternary symmetry is seen. A *quinary* symmetry of the parts is a fundamental form of organised things. Thus, M. Dugès strongly argues that five is the fundamental number of parts in a limb of the Vertebrates. The single bones he believes to be fusions or integrations of the five elements; and he maintains that the differentiation progresses as the limb is distant from the trunk. Thus in the arm, there is one bone; in the forearm, two; in the first carpel row, three (the pisiform bone being a true sesamoid); in the second carpel row, four; in the metacarpus, five, but covered with skin and muscle; and finally, five in the free moving fingers. M. Dugès supports his argument by numerous facts drawn from embryology and comparative anatomy.†

* Dr Whewell. *History of Scientific Ideas*, vol. ii. p. 73.

† *Memoire sur la Conformitè Organique dans l'Echelle Animale* (4to, Montpellier, 1832), p. 43.

248. This quinary development and integration of parts is by no means an isolated fact in organisation. Thus M. Moquin-Tandon has observed that in the medicinal leech every five segments, with their ganglia, contain all the essential elements of a complete animal. The same law of development is to be observed in the Nephelis. It is differently manifested, however, in other members of the Leech family. The completion of the organisation occurs with every three rings in the *Branchellion*, the *Ponbdellæ*, and the *Glossiphoniæ;* with every two rings in the *Branchiobdellæ;* and with every ring in the *Piscicolæ.** The general prevalence of the quinary arrangement, or multiples of it, in radiate animals, as in the *Asterias*, and throughout dicotyledonous plants, points to a general law of quinary development, of which the production of limbs is one of the manifestations. The apparent exceptions in animals and plants are simply and easily accounted for by the law of integration of two or more of the fundamental elements, or the differentiation of one above the rest. It is no unimportant general fact in support of this view, that the number five is nowhere symmetrically produced in inorganic bodies.†

SECT. III.—*General Laws of Contingent or Variable Forms in Organisms.*

249. It is in the forms of living things that the greatest variation is manifested, for the reasons already set forth (236). In these, as in the forms of inorganic matter, the forms are due to the action of the forces.

* *Monographe de la Famille des Hirudinées*, 2d edit. p. 197, footnote.

† Dr Whewell. *History of Scientific Ideas*, 3d. edit. vol. ii. p. 72.

Now these are vital, and manifest, therefore, the teleiotic idea of adaptation throughout all the vital processes, whether they be operative in the tissues, that is, inducing teleorganic change, or whether they act upon instruments expressly adapted for motion to ends, as limbs.

250. The mutations of form take place, however, in organic beings, within the limits of the fundamental type, as determined by the archetypal idea; but they vary in extent in organisms according to the variety of external conditions to which they have to be adapted. These mutations are sometimes so great as to lead naturalists to the conclusion that new genera or species are formed. This is more particularly observed when a *succession* of individuals have been subjected to similar external conditions, so that the same adaptation has been exercised from generation to generation, and thus a strong tendency to change of form developed. Mere functional activity at successive moments of existence, or in successive periods of existence of the organism, will, however, lead to changes in form. Thus in the Amæba, and other protozoa, the archetypal form seems to be lost to a great extent in the functional form; for the animal changes its outline in accordance with the uses to which it puts its entire body as an organ of prehension and digestion. In plants, and in higher animals, the functional form is known as the *position*, *attitude*, *expression*, and the like, and constitutes the characteristic features of the individual. These functional variations in form lead to variations of the individual from the generic or specific type. M. Agassiz points out this source of variation as indicating the need that naturalists should collate the habits of animals with their forms; "then we shall know," he says, "what is yet too little noticed, how extensive the range of variation is among animals, ob-

served in their wild state, or rather, how much individuality there is in each and all living beings. So marked, indeed, is this individuality in many families —and that of the turtles affords a striking example of this kind—that correct descriptions of species can hardly be drawn from isolated specimens, as is constantly attempted to be done. I have seen hundreds of specimens of some of our chelonians, among which there were not two identical; and truly the limits of this variability constitute one of the most important characters of many species."*

251. The study of Embryology and Development has shown to what an extent the form varies at different periods of existence—so extensively, indeed, that with many organisms, it is wholly different at different periods. Thus, there is no similarity in outward form between the beetle and its larva, and little between the butterfly and its caterpillar. In the Echinoderms there is a wonderful diversity of development; still more remarkable is it in the "alternation of generations."

252. Archetypal symmetry is often modified. This disturbed symmetry is due to various causes. The majority have reference to Function. This is seen in fishes, like in the Rays, Skates, Flounders, &c.; others have reference to the action of external forces, as atmospheric pressure, gravity, light, and the like. Hence arise, certainly, some of the changes in the form of various plants, and probably in various animals. Mr Hinton has ingeniously endeavoured to apply this principle of the action of external forces to an explanation of certain symmetrical forms in plants and animals. "Organic form," he says, "is the result of motion. Motion takes the direction of least resistance. Therefore,

* *Essay on Classification*, p. 84.

organic form is the result of motion in the direction of least resistance." He finds the spiral form to correspond to this conclusion. "Throughout almost the whole of organic nature, the spiral form is more or less distinctly marked. Now, motion under resistance takes a spiral direction, as may be seen by the motion of a body rising or falling through water. . . . Parts which grow freely, as the horns of animals, and the roots of plants when caused to grow in water, often present the spiral form in great perfection. . . . The spiral form of the branches of many trees is very apparent, and the universal spiral arrangement of the leaves around the stem of plants needs only to be referred to," &c.* Mr Hinton mentions the development of various organs and structures to be illustrative, as he believes, of this law; the heart, intestines, the head, nay, the entire embryo of the mammal, represents a left-handed spiral. He seems, moreover, to object to the doctrine of Final Causes, as applied to organisation; but he apparently has not a full comprehension of it, or his opinion has been formed upon imperfect expositions of it. Recognising that organisation is an "absolute rightness and order," he asks, "how should this be attained except through motion in the direction of least opposing force? What else is this law of motion but that exact rightness seen from the human point of view? Does it not mean that each minutest part determines the being of every other, —a perfect mutual interaction and subordination, a rightness from the very first, and through every step, that must end in a completed rightness at the last? Let us try to think of this, freeing our minds from preconcep-

* "On Physical Morphology, or the Law of Organic Form," by James Hinton, M.R.C.S., *Brit. and For. Med.-Chir. Review* (Oct. 1858), vol. xxii.

tions. How can there be other than perfect order and adaptation in that organisation in which each part has had its equal share in the moulding of the whole? There unity must be, and beauty, and most exquisite harmony, for there law has been perfectly fulfilled." Mr Hinton's theory is of a very ingenious kind, and although imperfectly worked out, it must be admitted that it contains a truth. It cannot be forgotten, however, that there is a something—a cause—of the differences in form inherent in organisms, quite independently of the external conditions; and that it is to the adapted play between the internal developing and external resisting force, and not to the latter only, that forms are due. A crystal may be modified as to its form by external conditions, but there is nevertheless a generic form to be modified.

253. In an interesting communication, published in a succeeding number of the *Brit. and For. Med.-Chir. Review* (January 1859), Mr Herbert Spencer further illustrates this theory, and points out how external conditions determine or modify the form of both plants and animals. Mr Spencer thinks the doctrine of an ideal type to be an "untenable hypothesis," but as he requires the aid of "the law of hereditary transmission, understood in its most transcendental sense," to render his views generally applicable, it does not appear that anything is gained by discarding the doctrine of an ideal type; for the doctrine of hereditary transmission is in truth but another form of it, since that means the necessary or causal connection of the forces of an individual organism with the forces of an organism like it, which necessarily preceded it in time. The hereditariness limits the development, so that under no conceivable external conditions could a mushroom be modified into a man.

254. These considerations bring us to the considera-

tion of specific forms, as distinguished from individual forms, and to the question of the origin of species. Now, just as individual forms are determined by derivative laws of the great biotic law of adaptation to ends, so also are specific forms. But there is this difference, that whereas, as to the former, the law aims at the continuance of the individual in time and space; as to the latter, it aims at the continual succession of individuals —that is, of living things. This is really the point to consider, and not whether there is a teleological maintenance of species, or fixed forms. What is not found in the particular cannot be predicated of the general, but the contrary. Now, as we find that functional and structural variation of form is the law of succession and coexistence in the vital phenomena of the individual, we must logically look for the operation of the same law in the species, for that is nothing more than a group of individuals. Hence, so far from there being a law of immutable specific form, we have just the contrary in operation, and mutability of form of species is the absolute.

255. Let us examine this question fundamentally. We know that every living thing, whether plant or animal, manifests a variety of processes, the general law of which is the law of continuance in life—the *lex nostri conservatio* of physiologists. This is the object of processes like those of growth, nutrition, development of organs and tissues, and of the modes in which the organs are used—that is, of the instincts or instinctive processes. It is, however, a more general law that the individual life shall cease—that is, that continuance in Time and Space for the period to which it is adapted is not an indefinite period, but only a small cycle of changes (225). Yet, while the individual perishes, the species is maintained in continuance, or the individual lives on in the life

of its offspring. And if, in the course of time, those cycles of physical or cosmic changes to which the species are adapted are modified, the species is further adapted to the modifications; and although in the process it happens that something like a new species arises, still, amidst all these changes, extending, as geology and palæontology teach, through periods of time of immeasurable length, Life continues, ever changing its form in adaptation to external nature, but never ceasing its manifestations. Thus, then, with the great law of Life, the law of adaptation to ends, manifested in every series of successive events, we have also never-ceasing change and ever-enduring stability from age to age.

256. It has not been found possible to escape this general conclusion as to the continual adaptation of organisms. It is seen alike influencing the philosophy of M. Lamarck, of the author of the "Vestiges," of Mr Darwin, and of Mr Sedgwick. "In one sense it may be true," the latter remarks, "that time has influenced the development of organic life. For during past epochs, the superficial temperature of the globe, the distribution of land and water, and, in one word, all the great physical causes which modify the distribution of the animal and vegetable types, appear to have undergone a succession of slow, gradual changes; and while we are contemplating these changes, we seem to be ascending step by step to the conditions of the existing period. On this view we might naturally expect the organic types of the old world to exhibit a development towards the forms of living nature; not, however, simply as an effect of time, but rather as an effect of physical conditions brought about gradually during the long lapse of time."*

* *A Discourse on the Studies of the University of Cambridge* (5th edit.), preface, p. lvi.

257. From the teleological point of view, the absolute, universal, and fundamental is the morphic archetype; within this, and as its derivatives, changes take place, which, in relation to it, are the contingent and particular. Hence, while in one sense there is no change—*i.e.*, as regards the fundamental object and plan—in another sense there is incessant change; so that not even two *individuals*, in the more highly evolved organisms, are alike (250). As to the permanence of fundamental life, a remark of Professor Huxley is worthy notice, who observed, in a discourse on the persistent types of Animal Life, delivered at the Royal Institution, London, June 3d, 1859, that after long investigation he concluded that only eight or nine ordinal types of animals were extinct, out of one hundred and twenty recognised types; and he added, on the authority of Dr Hooker, the eminent botanist, that of the two hundred ordinal types of plants, not one was wanting. He illustrated his views from all departments of the animal kingdom, from the polyzoa to vertebrata. He thought that this little change of type indicated "that each is but the result of an enormous series of antecedent changes of form, the whole of which are perhaps for ever hidden from us in the abyss of Pre-geologic time."

258. It is to be noted, however, that there is another result of the fundamental law of Mind manifested in creation, too important to be omitted here. Incessant change, we have seen, is a fundamental condition of all phenomena. Changes thus occurring in the distribution and operation of the external forces of nature influence the operation of the vital forces of organisms. In either case, the incessantly succeeding changes are observed to end constantly in varieties of things. This is the fact; so that multiplicity and variety correlate unity and permanence, as well as incessant change. We may there-

fore conclude, that although the laws of development, known as the law of unity of type and permanence of species, are amongst the general laws of life, the laws of multiplicity and variety correlate them. Now, the continuance of the species in Time and Space is a continuance of individual Life in multiplicity—the one individual producing the many.

259. If we examine how it is that multiplicity and variety are manifested, we must go back theoretically to a conceivable time when an archetypical mode of existence was first entered upon; just as we go back to a conceivable time when the planetary masses acquired their forms and motions. Now, looking closer, we observe that the same law is manifested in primary life as in primary motion. The form of Existence or the Archetype, once launched in time and space, continually tends to reproduce itself in successive organisms in a sort of cycle of changes. And this is true, not only as to the transmission of the archetypical characters of the species, but also as to deviations from, or variations in, the form and functions of organs from those of the archetype, the consequence of the incessant operation of the law of adaptation to variations in external conditions—that is to say, in the operation of the forces of nature. Now, these variations in external conditions on the large scale are climatic, and lead to varieties due to climate; or they are æonic, and have taken effect from age to age, during an immeasurable period of years, characterised by successive geological changes or cataclysms of great magnitude. Such changes have influenced greatly the form and function of particular elements of organisms of every kind (256). Nevertheless, however great the changes in this respect, the laws of unity and permanence, as the absolute and universal, amidst all the variety and multiplicity, are

demonstrably efficient. Hence, as I have already observed elsewhere,* with reference to the law of unity, "just as the great law of matter is applicable to the countless suns and systems that for countless ages have swept, and that still sweep, through space, whether they be already discovered or are still to become visible—so also this great law of Life is applicable to all life, whether animal or vegetable; to all functions, whether comprehended or yet to be discovered; to life in all epochs; to all living things, of the past as well as of the present." The Rev. Baden Powell has treated this question in an admirable manner: "Throughout all formations," he observes, with reference to the past, "the grand truth to which every accession of geological discovery bears witness, is the unity of plan continually exemplified in all the varieties of organic structure disclosed. Even the most seemingly monstrous and incongruous forms of animated existence in past times are all, without exception, constituted according to a common plan, and with parts, organs, and functions, related by the closest analogies to each other, so that no sooner is a new form discovered than it is instantly assimilated with some known type, and found to hold an assignable place in the system."† And, in reference to the conditions of existence and the external world, to which organisms are both adapted and adaptable, he adds, "Of organised life, we find some of the conditions equally unchanged [as the physical conditions]. The animals and plants of those remote epochs were, like those now existing, subject to the same general physiological laws of respiration and circulation, digestion and nutrition, locomotion and instincts; their eyes and

* *On the Principles and Methods of Medical Observation and Research*, by T. Laycock, M.D. (1860), p. 182.

† *The Unity of Worlds*, p. 337.

ears adapted to the same optical and acoustical conditions; their reproduction generally regulated by the same general laws."*

260. If we speculate as to the future, can we doubt that these laws will be still the laws of life and organisation from age to age, as they have been from age to age, and such as they are now? for do we not see that these laws are correlative with the primary laws and forces of matter itself, and will only cease when these come to an end?

261. The development of varieties in plants and animals, and of hereditary characteristics as to structure and functions, is due, therefore, to the law of permanent action with incessant change. Place an organism under such conditions as to light, heat, food, protection from hurtful agencies, and the like, that they differ from those amidst which the parent organism existed, and changes in adaptation to the new conditions, involving both structure and function, will be developed. In other words, the vital forces will have a new direction given to them, in so far as the new conditions are operative. But this new direction is integrated in the sperm-cell and germ-cell, and continued on to the reproduced organisms, and so on, as long as they are not modified or deflected, as it were, by great variations in external conditions.† The transmission of a predisposition to hereditary diseases,

* *The Unity of Worlds*, p. 359.

† Mr Darwin's work on the origin of Species having attracted so much attention so very lately, and having been so fully discussed, it is hardly necessary to do more than call the reader's attention to it, as an instructive and important addition to the literature of this part of the subject. The article "Skeleton," by Mr Maclise, in the *Cyclopædia of Anatomy and Physiology*, is also worthy notice, as an interesting exposition of the operation of the law of variety in unity in the development of the archetypal skeleton.

whether of the blood generally, of the blood-vessels, or of special organs, as the heart, lungs, brain, is nothing more than a continuance, in a new direction, of the vital forces induced by those conditions which are known so to modify vital functions as to render them morbid. That such predispositions are not manifested permanently as varieties, is due to the general law, that, since disease is but a feebler resistance to the causes of death, the progress of the morbid condition in each successive generation accelerates the extinction of the family or race, so rendered hereditarily morbid. In this way the law of adaptation to ends, as regards the species, is manifested as the teleiotic idea of Perfection; and the extinction of what may be termed "morbid varieties," is nothing else than the result of the operation of a fundamental law, by which the purity and vigour of the species is maintained, and life continually advanced towards perfection.

CHAPTER XII.

THE LAWS OF EVOLUTIONAL DEVELOPMENT OF ARCHETYPAL FORMS.

262. In the chapters on Ideas as Causes (chaps. vi. vii., p. 270, *sqq.*), I have pointed out the causal relations of ideas to phenomena, and have particularly indicated the law of evolution of a fundamental idea. This evolutional order of phenomena has been specially observed in reference to organisms in all ages, and, as the law of morphological evolution, according to a plan pre-conceived and pre-arranged, has had abundant illustration from the labours of philosophical zoologists. The latest and most important contributions in this country to the elucidation of the problem are those of Professor Owen.

263. It will readily be understood that the fundamental biotic ideas which I have defined already, are those which are termed by Mr Maclise, Professor Owen, and others, *Archetypes*, or *Archetypal Ideas*. M. Agassiz shows very clearly how such a general teleiotic idea—a derivative of the idea of unity—is evolved like the *contenta* of a general proposition, as if by a deductive process, throughout the various organisms that constitute a great branch or type of animal Form and Life. He observes, in discussing the order of succession of vertebrata in past ages, and comparing the respective classes, from their earliest representatives to the latest, that through all their intricate relations of type and structure, there seems an evident

tendency towards the production of higher and higher types, until at last Man crowns the whole series. "Seen, as it were, at a distance, so that the mind can take a general survey of the whole, and perceive the connection of the successive steps, without being bewildered by the details, such a series appears like the development of a great conception, expressed in proportions so harmonious that every link appears necessary to the full comprehension of its meaning, and yet so independent and perfect in itself, that it might be mistaken for a complete whole; and again, so intimately connected with the preceding and following members of the series, that one might be viewed as flowing out of the other. What is universally acknowledged as characteristic of the highest conceptions of genius, is here displayed in a fullness, a richness, a magnificence, an amplitude, a perfection of details, a complication of relations, which baffle our skill and our most persevering efforts to appreciate all its beauties."*

264. It is to be noted, therefore, that, just as in the life of the individual there is a period of imperfection and defective evolution, so as to the species, and its life in time, there is a period of imperfect evolution. M. Agassiz has worked out this parallelism, and shown the analogies between the geological (or æonic) succession of animals, and the embryonic growth of their living representatives. His conclusions are thus given:—"It may therefore be considered as a general fact, very likely to be more fully illustrated as investigations cover a wider ground, that the phases of development of all living animals correspond to the order of succession of their extinct representatives in past geologic times. As far as this goes, the oldest representatives of every class may then be considered as embryonic types of the

* *Essay on Classification*, p. 166.

Comatuloids; the oldest Echinoids, embryonic representatives of the higher living families; Trilobites, embryonic types of Entomostraca; the Oolitic Decapods, embryonic types of our Crabs; the Heterocercal Ganoids, embryonic types of the Lepidosteus; the *Andrias Scheuchzeri*, an embryonic type of our Batrachians; the Zeuglodonts, embryonic Sirenidæ; the Mastodonts, embryonic Elephants,"* &c. This law of embryonic types goes beyond genera into "hyper-embryonic types, in which embryonic features are developed to extremes in the further periods of growth; as, for instance, the wings of the Bat, which exhibit the embryonic character of a webbed hand, as all mammalia have it at first, but here grown out and developed into an organ of flight; or assuming in other families the shape of a fin, as in the Whale or the Sea-Turtle, in which the close connection of the fingers is carried out to another extreme."†

265. Now, just as the embryonic stage of an individual animal prefigures its future stages, so geologic types prefigure future developments of species. These latter, M. Agassiz remarks, "may be considered as exemplifying, as it were, in the diversity of animals of an earlier period, the pattern upon which the phases of the development of other animals at a later period were established. They now appear like a prophecy in those earlier times of an order of things, not possible with the earlier combinations then prevailing in the animal kingdom, but exhibiting in a striking manner the antecedent consideration of every step in the gradation." Hence, M. Agassiz has designated such geological types of animals *prophetic types*. These, and other facts, tend to establish the idea of an æonic generation and development of species and organic worlds, as of a temporal generation and development of individuals. "Perhaps,"

* *Essay on Classification*, p. 174. † *Ibid.* in *loc. cit.*

Professor Owen remarks,* "the most important and significant result of palæontological research has been the establishment of the axiom of *the continuous operation of the ordained Becoming of living things.*" We see, then, that the doctrine of archetypal ideas is founded upon a true induction.

266. Each species of animal and vegetable is characterised by its own peculiar structures and instincts, in virtue of which its vital forces are determined in adaptation to the conditions in which it is placed, and to the ends of its existence; beyond these it does not pass either in act or structure, except by such development of new instincts and intuitions (the results of experience educed by external conditions) as it is capable of. Such development of the forces is, however, only a mode of contingent adaptation to ends, and occurs, therefore, like all other vital processes, in accordance with the law of design, of which it is a derivative manifestation.

267. In organisms we can thus distinguish two series of processes; namely, those which they *manifest* necessarily, and those of which they are *capable* or are endowed with potentially, but do not manifest necessarily. The former being necessary are *absolute*, and are effected by mechanism proper to the genus and species. It is this mechanism which gives the form or visible position in space to the organism, and supplies to the zoologist those characters upon which they base their morphological classifications, as the tracheæ, gills, lungs, limbs, spine, nervous system, and the like. The latter processes are *relative*, and the sources of the various modifications in structure and instincts which organisms undergo when placed under new or varying conditions—or, in other

* In his able article "Palæontology," *Encyclopædia Britannica*, 8th ed. vol. xvii. p. 91.

words, subjected to the influences of the physical forces. Now, both these processes are results of the law of design, but the former is morphologically teleiotic; that is to say, the absolute form of the organism is developed according to a fundamental pattern or general type (the archetype). And as there cannot be a pattern without a fundamental idea, so there cannot be construction without the subordinate or derivative ideas, which are necessarily expressed in the pattern (156, *sqq*). An eminent living French zoologist has put this notion in a clear form: "At this point of our inquiries, the entire mass of beings which we have been studying will appear to us to be decomposed into a somewhat limited number of primitive types, around which their *immediate derivative* types are disposed at various distances, and in accordance with a certain order. These are in their turn surrounded by *secondary derivatives*, and so on in consecutive series. Existing species may all be classified within this theoretical animal kingdom, being distributed in accordance with the degree of resemblance which they present to ideal types. It is thus that the celestial bodies, grouped together in a thousand different ways, gravitate around one another, with their planetary attendants circling round them either isolated or accompanied by satellites. On our earth, no less than in celestial space, we find that Nature faithfully adheres to those wondrous laws of analogy which she observes in all her grander manifestations; and thus we behold on the surface of our globe the same spectacle of unity and harmony which, in the immensity of space, strikes the senses with the profoundest impressions of wonder and admiration."*

268. Such a general principle seems to be the neces-

* *Rambles of a Naturalist*, by A. de Quatrefages, translated by E. C. Otto (1857), vol. i. p. 98.

sary result of the laws of human thought. In our own minds, we find that what we term Ideas are causes of rational actions; that is to say, that they necessarily precede or coincide with certain formative acts of which we are conscious (148). This is a fundamental intuition of cause; and we thence infer that ideas are the causes of form and development, and nutrition to an end. But whence, it is asked, come these ideas? Clearly not from the organism itself, for they precede it, inasmuch as they are manifested in the parent; clearly not from the parent, for they are derived from its parents through an infinite series of successions. We necessarily, therefore, seek for their source in an Intelligence external to the organism, and that something is named the Creator. Consequently the forms of organisms and the functions of their parts are said to correspond to a Divine Ideal (151, 200).

269. This is essentially the doctrine of Plato and the older Greek philosophers as to Ideas. "Plato," says Kant, "employed the expression *Idea* in a way that plainly showed he meant by it something which is never derived from the senses, but which far transcends the conceptions of the understanding, inasmuch as, in experience, nothing perfectly corresponding to them could be found. Ideas are, according to him, archetypes of things themselves. . . . In his view they flow from the highest Reason, by which they have been imparted to human reason; which, however, exists no longer in its original state, but is obliged with great labour to recall by reminiscence—which is called Philosophy—the old but now sadly obscured ideas."* Again: "But not only in that wherein human reason is a real causal agent, and where ideas are operative causes (of actions and their objects)—that is to say, in the region of Ethics—but also in

* *Kritik der R. Vernunft*, Transcend. Dialectic, book i. sect. i.

regard to Nature herself, Plato saw clear proofs of an origin from ideas. A plant, an animal, the regular order of nature, probably also the disposition of the whole universe, give manifest evidence that they are possible by means of, and according to, Ideas; that, indeed, no one creature, under the individual conditions of its existence, perfectly harmonises with the idea of the most perfect of its kind—just as little as man with the idea of humanity, which nevertheless he bears in his soul as the archetypal standard of his actions: that, notwithstanding, these are in the highest sense individually, unchangeably, and completely determined, and are the original causes of things; and that the totality of connected objects in the universe is alone fully adequate to that idea."*

270. The divisions of *genus* and *species* of Aristotle (the great philosophical zoologist of Greece) are apparently founded on this doctrine of archetypal development,—the former word (γενος) applying to the branch or type which is generated in or in virtue of the archetypal or general idea (188); the latter (ἔιδος) being the form (*species præstans, forma*) in which the idea—the ideal form or *species* (εἰδέα)—is manifested. Internal evidence is not wanting to prove that the excellences of Aristotle's classification were due to the conception he had formed, although imperfectly, as to the true causes of development, and which he applied to zoonomy with all the completeness that the then existing state of knowledge admitted of. In the Aristotelian school of logic, "the five words" which denoted the nature and relation of classes, are Genus, Species, Difference, Property, Accident. Now, according to Porphyry, Genus and Species are superior and inferior classes, capable of repeated subordination; in this respect showing that to be the quality of general ideas which

* *Kritik der R. Vernunft*, Transcend. Dialectic, book i. sect. i.

belongs to the archetypal ideas. "The 'most general' Genus is the widest class; the 'most special Species' the narrowest. Between these are intermediate classes, which are Genera with regard to those below, and Species with regard to those above. . . . The 'difference' is that which is added to the Genus to make the Species: thus Rational is the difference by which the genus Animal is made the species Man; the difference in this technical sense is the 'specific,' or species-making difference (εἰδοποιός). It forms the 'definition' for the purposes of logic, and corresponds to the 'character' (specific or generic) of the natural historians."* Here we recognise, under another terminology, the ancient notion of the evolution of ideas as causes, in which each antecedent and co-existent is not only the necessary antecedent and co-existent, but also the more *general* (the phrase cannot be avoided), or less differentiated, than the consequent, or the results.

271. The doctrines of Aristotle, like those of the modern sciences, were the culmination of a long series of philosophical inquiries and researches. Hence his biological principles and views can only be thoroughly understood by comparison with those of his predecessors and contemporaries, upon which they are in fact based. For example, his division of subjects into the physical and metaphysical has in truth an older doctrine, that of the Eleatics, for its foundation. Of this school, Parmenides was the nearest to the time of Plato and Aristotle, and most strenuously maintained the doctrine of causal ideas, as the real things in phenomena. These being the causes of things, were distinguished by the older philosophers from their effects; which latter (the phenomena of nature) were termed φύσις—that is, *the Generated* (το γιγνομενον of

* *Vide* Dr Whewell's *History of Scientific Ideas*, 3d edit. (1858), vol. ii. pp. 105–6.

Plato)—from the perfect passive of *φυῶ*, *gigno*, *edo*, *pario*. Hence *Phusis* meant also *sexus*, *pudenda*, as indeed "nature," in an old and still popular sense, means *semen*. According to the notion of these ancient speculators, these causal principles operated in inert matter in the same way that the vivifying principle of the seminal fluid operates in the *ovum*. The world of matter was, in fact, literally compared to an egg, of which the Divine Reason was the vivifying principle. In his speculations on the generation of animals, Aristotle distinguishes first causes more philosophically, marking the difference between the first cause of order to ends and the first cause of motion—*ἡ ἀρχη τῆς κινησεως*. "Of these two causes, the chief seems to be the final or intending cause, for this is Reason (λογος), and Reason is alike the first cause —*αρχη δε ο λογος*—in both Art and the harmonious combinations of Nature."* Zeno and his followers, the Stoics, maintained that this *logos* was God; and that, as a fire-like agent, He contained within Himself all these derivative causes, by which, according to an inevitable order, everything is generated or produced. These derivative causes were therefore termed Spermatic *logoi*.

272. It was in this way that the term *Phusis*, The Brought-forth, as we should say, or, The Developed, signified the phenomena of creation, and more particularly of organised creation. The *Physica* were those things which were considered to be the manifestations of the causal or generating principles, or the "Sensibles;" while the *logoi*, the "Intelligibles," were the *Metaphysica*—the causes themselves.

273. Physiology, in the ancient sense of the term, was therefore the science of phenomena as results of derivative "reason" (*physiologoi*), and was only another word

* *De Partib. Animal.* lib. i. cap. i.

for the philosophy of nature, including biology and mental physiology, in the modern sense of the terms. Hence Aristotle's treatise on the *Psyche* was included amongst the *Parva Naturalia*, he having declared that the consideration of the *Psyche* is part of the philosophy of nature.* On the other hand, Metaphysic is the determination and application of the causal ideas to an explanation of the phenomena of reason and to the philosophy of the human mind (180). Thus defined, it was divisible into two parts, namely, the philosophy of necessary or absolute truth (αληθεια, the *Not-hidden*, from α, privative, and ληθη, *concealed*), and the philosophy of opinion or consciousness (δοξα from δοκεω, *Existimo, video*). The one dealt with "pure reason," the λογος,—the other, with pure reason as manifested by or concealed within organisation—that is, human thought.

274. How deeply the entire philosophy of the Greeks was interpenetrated with this doctrine of Causal Ideas, and of Mind as the first cause, has been admirably shown by the learned Cudworth—the following quotation from whose great work will serve to show at what an early period it was developed in Greece, and at the same time how fully Aristotle understood and accepted it: "Wherefore Parmenides thus asserting a trinity of Divine hypostases, that was properly called by him ἓν τὸ πᾶν—that is, one most simple Being, the fountain and original of all; and the second of them (which is a perfect intellect) was, it seems, by him called, in way of distinction, ἓν πολλά, or πάντα, 'one-many,' or 'one-all-things;' by which 'all things' are meant the intelligible ideas of things that are all contained together in one perfect mind. And of these was Parmenides to be understood also, when he

* *De Animâ*, lib. i. cap. i. Compare Sir W. Hamilton's *Lectures on Metaphysics*, vol. i. p. 127.

affirmed that all things did stand and nothing flow [were permanent], not of singular and sensible things, which, as the Heraclitics rightly affirmed, do indeed all flow [undergo change], but of the immediate objects of the mind, which are eternal and immutable; Aristotle himself acknowledging that no generation nor corruption belongeth to them, since there could be no immutable and certain science unless there were some immutable, necessary, and eternal objects of it. Wherefore, as the same Aristotle also declares,* the true meaning of that controversy betwixt the Heraclitics and Parmenideans, whether all things did flow or some things did stand, was the same with this—Whether there were any other objects of the mind besides singular sensibles that were immutable; and consequently, whether there were any such thing as science or knowledge which had a firmitude and stability in it? For those Heraclitics who contended that the only objects of the mind were singular and sensible things, did with good reason consequently thereupon deny that there was any certain and constant knowledge, since there can neither be any definition of singular sensibles (as Aristotle writes),† nor any demonstration concerning them. But the Parmenideans, on the contrary, who maintained the firmitude and stability of science, did as reasonably conclude thereupon, that besides singular sensibles, there were other objects of the mind, universal, eternal, and immutable, which they called 'the intelligible ideas,' all originally contained in one archetypal mind or understanding, and from thence participated by inferior minds and souls. But it must be here acknowledged, that Parmenides and

* *Met.* lib. iv. cap. v.

† He states this to have been the opinion of *Plato*, and dissents from it.

the Pythagoreans went yet a step further, and did not only *suppose those intelligible ideas to be the eternal and immutable objects of all science, but also as they are contained in the Divine Intellect, to be the principles and causes of all other things.* For thus Aristotle declares their sense: 'The ideas are the causes of all other things (*ἄιτια τὰ εἴδη τοῖς ἄλλοις*), and the essence of all other things [each thing] below is imparted to them from the ideas, as the ideas themselves derive their essence from the first unity' (*τὸ τὶ ἦν εἶναι ἑκάστῳ των ἄλλων τὰ εἴδη παρέχοντἀι, τοῖς δὲ εἴδεσι τὸ ἕν*)*—these ideas in the Divine understanding being looked upon by these philosophers as the paradigms and patterns of created things. Now, these ideas being frequently called by the Pythagoreans 'Numbers,' we may from hence clearly understand the meaning of that seemingly monstrous paradox, or puzzling Griphus of theirs, that Numbers were the causes and principles of all things, or that all things were made out of Numbers; it signifying, indeed, no more than this, that all things were made from the ideas of the Divine Intellect, called Numbers; which themselves, also, were derived from a monad or unit:—Aristotle somewhere intimating† this very account of their assertion, that 'Numbers were the causes of the essence of other things, namely, because *τἀ εἰδη ἀριθμοι*—the ideas were numbers.' "‡

275. The fragments of this ancient philosophy which have come down to us indicate this, at least, that it contained many doctrines attributed to Plato, although he seems to have criticised it in a hostile spirit. Nevertheless, he held the Pythagorean doctrine in the sense here

* *Metaphysics*, lib. i. cap. vi. † *Ibid.*

‡ *The True Intellectual System of the Universe*, book i. chap. iv. sect. xxi.

given by Cudworth, as Aristotle held the Parmenidean doctrine, that ideas are not only types, but causes of phenomena. "Plato," says Aristotle, "thought that sensible Things [*i.e.*, phenomena], no less than their causes, were Numbers; but the causes are Intelligibles [*i.e.*, Ideas], and other things Sensibles."*

276. In one form or other, the doctrine of types, or archetypal ideas, has exercised so important an influence on modern zoology and biology, that it may be stated these sciences could have had no development without it, but would have remained an undigested mass of facts. Wolff, one of the greatest thinkers biology has ever had, not only anticipated Goethe in his great law of archetypal evolution of plants, but also showed the unity of animal life and organisation, so early as the year 1759, in his inaugural dissertation entitled *Theoria Generationis*, and subsequently in 1764, in his *Theorie von der Generation*. Wolff was long in advance of his day; for even when Goethe brought out his treatise on the metamorphoses of Plants, and developed the law of unity of type and evolution of parts, he had great difficulty in finding a publisher, and several years elapsed before the truth and importance of the law were recognised. In 1784, Goethe had also applied the idea to comparative anatomy, and led the way in philosophical anatomy, by attempting to determine the homology of the inter-maxillary bone; to be followed by Oken, Bojanus, Meckel, Carus, Von Baer, and other philosophical anatomists in Germany. In France (contemporaneously with Goethe), Vicq d'Azyr (in 1780), Geoffrey St Hilaire, Cuvier, Blainville, Lamarck, and others, and in England, John Hunter, have developed the same idea; so that it is now the unquestioned basis of philosophical zoology, including

* Mr G. H. Lewes. *Biog. Hist. of Philosophy.*

embryology, and development generally. Professor R. E. Grant was amongst the first to teach it in England. In more recent times, the works of Oken and Professor Owen have helped to promulgate it, as applied to the differentiations of the typical vertebra; of Von Baer, as applied to the differentiations of the fundamental tissues of the embryo; and of Milne Edwards, as to the differentiations of function.

277. Mr G. H. Lewes has some remarks on this subject worthy notice :—"The law announced by Goethe," he observes, "and I believe distinctly announced by him for the first time, is now to be met with in every philosophic work on zoology. One form of it is known in England as Von Baer's law—viz., That Development proceeds from the Like to the Unlike, from the General to the Particular, from the Homogeneous to the Heterogeneous; and has by Owen, Carpenter, and Huxley, been often lauded and applied. I have too profound an admiration for Von Baer to wish in any way to diminish his splendid claims; but I cannot help remarking, that when Dr Carpenter attributes to him the merit of having discovered this law, he is in direct contradiction with Von Baer himself, who not only makes no such claim, but, in giving the formula, adds, 'This law of development has indeed never been overlooked.' His merit is the splendid application and demonstration of the law, not the first perception of it. It is generally known that the law of 'division of labour in the animal organisms' is claimed by Milne Edwards, the great French zoologist, as a discovery of his own. Yet we see how clearly it is expressed in Goethe's formula. And with even more clearness, also, we see expressed Cuvier's principle of classification—viz., the *subordination of parts*. I do not wish to press this point further; nor do I wish that these great men should be

robbed of any merit in order to glorify Goethe with their trophies. The student of history knows how discoveries are, properly speaking, made by the age, and not by men. He knows that all discoveries have had their anticipations; and that the world justly credits the man who makes the discovery *available*, not the man who simply perceived it possible."*

278. Whether regard be had to the speculations of the earliest Greek philosophers (and we might even ascend from them into the still higher antiquity of Egyptian and Indian metaphysics), or whether we consider the more precise because inductive developments of the doctrine in modern times, we have essentially nothing else than a demonstration—by the orderly arrangement of the phenomena of development, form, and function—of the great law of mental causation, namely, the evolution of the special from the general, the contingent from the absolute, the particular from the universal. What is now needed, therefore, is to correlate the laws of Thought with the laws of Life, so as to show their common origin and nature, and so bring them into unity.

* *The Life and Works of Goethe* (1855), vol. ii. p. 152.

CHAPTER XIII.

FUNDAMENTAL LAWS OF VITAL ACTION.

SECT. I.—*Fundamental Ideas as Vital Energies.*

279. HAVING considered the conditions of Existence of organisms, and their relation to time and space as a whole, we have now to determine the relations of Causal Ideas to the order of vital phenomena in general.

All these go on in accordance with a law of design, and with the result that *some* end is attained, as growth, nutrition, aëration or depuration of the blood, and the like. Now, as the idea of power, working internally in organisms to ends, is necessarily associated with these phenomena, the cause is termed an ENERGY. The term is expressly intended to indicate this internal operation of the vital forces to ends: ἐνέργεια *ab* ἐνεργεω, *intus efficio, ago.* In unconscious things the Energy is termed *vital;* in conscious organisms it is known as *mental* Energy. The vital energies are of two kinds: *first*, they are either *vegetative*, with purely internal relations; these effect all the phenomena of development, nutrition, repair, reproduction; or, *secondly*, they are the moving causes or powers of the organs which are constructed in adaptation to external things. In this class are included all the instincts, whether animal or vegetable. But, *thirdly*, when states of consciousness accompany their operation, they are the feelings, ideas, motives,

and the like, acting as passions, emotions, and faculties. Since the result of the operation of all Energies—that is, of the internal operation of forces to ends—is the realisation in time and space of the scheme or plan contained in the universal law of design, it is obvious that the fundamental laws of vital action will be correlative with fundamental biotic ideas, which have all their modes of teleiotic energy as derivatives of the general law or idea of adaptation to ends. And as these are also correlative with the fundamental laws of consciousness and thought, it is obvious that in determining the one class of energies and ideas, we must also determine the other. This, then, I now propose to do, as to the primary and fundamental laws and ideas.

280. *The Teleiotic Idea of Unity as a Fundamental Law of Life.*—Looking at the entire phenomena of creation as a result of a law of design, we can only consider them as being developed in such relation to each other that the ends aimed at in creation shall be attained. For the attainment of ends through the operations of many things, it is necessary that those operations be in harmonious relation to each other, so that the *one* end aimed at be attained by the conjoint operations of the *many*. Now, this end of the law of design correlates the idea of unity in the law of design, or the combination of all things into a whole of mutually related parts. Metaphysicians and philosophers, speculating *à priori*, have come necessarily to this conclusion. In living things, it is remarked by a distinguished philosopher, "the parts make up the whole, but the existence of the whole is essential to the preservation of the parts. But parts existing under such conditions are organs, and the whole is organised. 'Organised beings,' says the physiologist Müller (*Elements of Physiology*, p. 18), "are composed of

a number of essential and mutually related parts.' 'An organised product of nature,' says the great metaphysician Kant (*Urtheilskraft*, p. 286), is that in which all the parts are mutually ends and means."*

281. It follows, therefore, that the fundamental idea and law of Life and Organisation—the "universal"—is the law and idea of Unity. Now, this comprises two other fundamental ideas—namely, many parts to be combined into one, or the many in the one, and multitudinous changes among the parts to be combined to one object, or in many objects having reference to the one. Every organism, as is proved by observation and deduction, is built up and acts according to, and in virtue of, derivative laws and forces (230). The structure and arrangement of the various parts of which an organism is made up, are not only in relation to each other, so as to constitute the organism a whole or a unity, but they are in relation to each other as *the* whole, so that the organism itself, as a thing existing, may be in relation to the conditions of its existence, or continuance as a whole, in Time and Space. These relations are established in virtue of the law of design, which, as manifested in organisms, may be better designated the law of adaptation to ends. "The system is organised," Dr Whewell observes, "when the effects which take place among the parts are *essential to our conception of the whole;* when the whole would not *be* a whole, nor the parts parts, except these effects were produced; when the effects not only happen in fact, but are included in the idea of the object; where they are not only seen, but foreseen—not only expected, but intended; in short, when, instead of being causes and effects, they are *ends* and *means*."†

* Professor Whewell. *History of Scientific Ideas*, 3d edit. (1858), vol. ii. p. 239.

† *Op. cit.* p. 240.

282. When the law of unity is conjoined with evolution and differentiation, unicity results. Professor Goodsir first promulgated the doctrine, afterwards confirmed by Virchow, that not only is the entire organism composed of simple or developed cells, each having an independent vitality, but that there is also a subdivision of the whole into departments, each containing a certain number of simple or developed cells, all of which hold certain relations to one central or capital cell, around which they are grouped. It would appear that from this centre cell all the other cells of its department derive their origin.*

In like manner, when organisms combine and form compound organisms, as trees or certain helminthoids (248), the law of unity is not different from that by which the parts of an individual organism are constituted into a whole, an *individuum;* or as solar systems are constituted into a whole in relation to other solar systems. Or, further, when organisms are not structurally but socially one, and so constitute a society, the same law holds good: the society is a unicity in reference to the ends for which the individual organisms are united together, or constituted into a whole. The idea of unity is therefore the most primary teleiotic idea of all phenomena, as well as the fundamental idea of Life. In cognition it correlates the fundamental intuition of the ONE. (Part I. Div. 3, Chap. viii.)

283. *The Law and Idea of Duality.*—We have seen that nothing can be known or can exist out of relation to something else, except the Absolute One (87 *sqq.*). The simplest and fundamental relation is that of One to One, or duality. The operation of this idea is manifested in the laws of motion of the heavenly bodies, in which the mutual antagonism of two kinds of forces in relation

* *Anatomical and Pathological Observations.* Edin. 1845, p. 2.

with each other is the cause of adapted movements in unity (119). So, also, in the molecular phenomena of matter; the idea is manifestly in operation in the law of polarisation, and perhaps in all the phenomena of form and molecular change. "The permanent and stable course of things," observes Professor Whewell, in discussing the application of the idea of polarity, "is that which results from the balance and neutralisation of contrary tendencies. Nature is constantly labouring after repose by the effect of such tendencies; and so far as polar forces enter into her economy, she seeks harmony by means of discord, and unity by opposition."* The same law is manifested in chemical synthesis or affinity, in virtue of which two opposing molecules, as of an acid or alkali, combine to form one thing, yet with a law of preference—that is, with "elective" affinity. The idea is also the fundamental idea of generation and reproduction. It is manifested most obviously in sexual organisms, but it is also seen in cell-production generally. In the genesis of society, whether of a few individuals or of tribes and nations, it plays an important part. Duality being only another form of the idea and law of "Relativity," it is obvious from preceding considerations (87, 141) the idea must be as fundamental an element in all cognitions, and in all operations of forces to ends, as the idea and law of unity. Without dualistic action, there can be no unicity.

284. *The Law and Idea of Multiplicity, Variety, or the Many.*—That this is a fundamental idea of the law of design, is proved by the same facts and arguments that prove unity. An archetypal idea necessarily includes unity of plan; acting as a cause, the idea must necessarily evolve the Many out of the One—many derivative ideas,

* *History of Scientific Ideas*, vol. i. p. 370.

and therewith many derivative phenomena, as the correlatives in time and space of those ideas (156). It follows, therefore, that plurality, multiplicity, and variety —all forms of the idea of the Many—are implied in the idea of unity. "Unity," says M. Cousin, "is anterior to variety; but although the one be anterior to the other, yet, when they are in being, how can they be isolated? What is an indivisible unity, a dead unity, a unity remaining in the depths of its absolute existence, and never developing itself into multiplicity, variety, and plurality? It is for itself as if it were not. In the same way, what is variety without unity? It is a variety which admits not of unity; which, therefore, cannot be referred to any unity, nor even elevated into a totality, nor into any collection whatever; nor can it ever be added together or make up a sum."*

285. *The Law and Idea of Infinity and Perfection.*— The idea of Infinity includes those of the five fundamental conditions of existence (202), namely, cause operating in matter and producing continual changes in time and space. The fundamental Energy is *Repetition* successionally, and either in cycles in time (225), or linearly and spherically in space. The observation of continual repetition in cycles, has led to the adoption of the circle as the symbol of eternity. Repetition by serial *Dichotomy* is the mode by which infinitesimally minute organisms are multiplied *ad infinitum*. Like all other teleiotic ideas, that of Infinity is a fundamental element of the thoughts and desires in all states of health, and correlates all our notions of Perfection. The realisation of the end aimed at in a teleiotic idea, whatever the idea may be, is that which we call Perfection. Hence each

* *Introd. to Hist. of Philos.*, translated by H. G. Linberg (Boston, U.S., 1832), p. 115.

thing, typically, is perfect in its kind. But all creation is the evolution of one idea; and consequently every derivative idea must possess the qualities of this, the primordial archetype. What such qualities are, have been well-expressed in a proposition renowned, says Kant, among the schoolmen, "Quodlibet Ens est unum, verum, bonum." It is only when multiplication and repetition attain their utmost extent in correlation with the closest integration—or in other words, when there is the highest development of the Many, and the closest union of the Many into a harmonious One—that absolute perfection is attained (284). Hence the universe, as the union of an infinite number of elements into One, satisfies our ideal conception of the Perfect, although we cannot *realise* the idea, because it is an infinite and absolute Perfection (210).

SEC. II.—*Evolutional Correlations of Teleiotic Ideas as Vital Energies.*

286. *Organic Chemical Affinity.*—We have now to consider how fundamental ideas are realised phenomenally in Time, and Space, and Consciousness, when manifested as the fundamental law of the processes of evolution and development. They are distinguished by names that indicate the order and relations of the phenomena by which the energy or causal idea is manifested. The formation of the one into many is multiplication, differentiation, reproduction; of the one into two, dichotomy; of the many into one, integration, combination, organisation. Considered as vital energies and causes of these processes, they are named variously, chemical affinity, vital forces, *vis inertiæ*, *vis nervosa*. When observed in special relation to structure and function, they have the names of nature (194), *Archæus*,

Psuche, *Anima* (14), *vis medicatrix*, *vis conservatrix*. When observed in relation to thought and consciousness they are termed *Anima*, the Mind, Soul, *Ego* (83). Nevertheless, whatever name may be given to these energies, or however they may be manifested, they all may be resolved into a force or energy which regulates the molecular forces in living matter, for without these there is no manifestation whatever of either Life or Consciousness. Physicists, deriving their notions of force, energy, and motion from muscular action (128), proceed to show that the molecular forces can be all so applied that they can be alike converted into motion, and made to do an equal amount of work, as expressed by a given weight lifted a given height—say one foot (104). In this way chemical affinity is classed with heat, light, electricity, galvanism, and magnetism. What, however, is common to all is, motion with relative position of the atomic or molecular constituents of the matter manifesting the forces.

287. Admitting the doctrine as to the convertibility of these energies, it is to be noted, that there are at least sixty elementary bodies which differ from each other in their atomic or molecular constitution (*i. e.*, as to their molecular motions), and we want to know how or why they differ. It does not elucidate the question as to the arrangement of their atoms, to say that the total of the motions can be expressed in foot-pounds, for those that are equal in this respect differ in chemical qualities. At least fourteen of these elementary bodies enter into the composition of the human body and subserve to vital action. All have their appropriate molecular motions represented by "molecular weight," and their appropriate elective affinities; and all must combine in living tissue to ends. If we inquire what is the fundamental fact here, we find that in the molecular composi-

tion of a living organism, just as in the organism itself, there is evolution from the simple to the complex in composition, until the molecular weight becomes colossal. These 100 parts of hæmoglobin (a most important blood-constituent) appears to be constituted of 54·2 carbon, 7·2 hydrogen, 0·42 iron, 16·0 nitrogen, 21·5 oxygen, and 0·7 sulphur; from which data it is calculated that the molecular weight of hæmoglobin reaches the enormous amount of 13,280. Now since blood-corpuscles, like all other tissues, are evolved according to the law of differentiation of function with complexity of structure, we may fairly infer that this enormous molecular weight is in some definite relation to their nutrient or vital properties, and that when the facts are better known, the evolutional relations may be expressed numerically. The direction of inquiry may be indicated thus—A primary molecule, whether it consists of one molecule rotating on its axis, or of two rotating in relation to each other, may combine in harmonic ratios (119) with one or more of the same kind, when the resulting compound is termed *allotropic*. Oxygen, phosphorus, sulphur, and iron—the four most important nutritive elements for brain and muscle work—are of this class; or (and this is more common), unlike elementary bodies with "elective" affinities, combine so as to constitute compound molecules with their harmonic motions; and these again with other unlike compound molecules, more and more complex, in ascending and differentiating series, yet all with motions in harmonic ratios, and resulting in different kinds of matter with different chemical qualities and affinities. In this way organic matter, in all its varieties, seems to be constituted. The sources of difference may be threefold: *first*, there may be differences in the *inertia* of the basic or elementary atoms; *secondly*, in the velocity with and in

the direction in which they move; *thirdly*, in the harmonic ratios of their motions. So that differences in combining proportions, when stated by weight, will indicate differences as to *inertia;* but when by volume (*i. e.*, space occupied), differences as to motion. The third kind of difference must be indicated in some other way; for bodies may be isomeric as to either weight or volume, and yet differ as to kinetic force. Dr B. W. Richardson showed, by experiments, that two anæsthetic fluids, isomeric in composition—viz., the acetate and formiate of methyl —so differ in atomic combination, that while the former requires a temperature of 268° Fahr. to vaporise it, or in other words, to overcome the pressure of the atmosphere, the latter requires only 121°—a difference not explained by either difference in the specific gravity of the fluid or the density of the vapour. The higher temperature required coincides, however, with increase of the carbon-molecule in evolutional series. Dr Crum Brown and Dr Fraser have detailed a series of novel and important experiments, showing that the iodide or sulphate of methyl, combined with the poisonous alkaloids, strychnia, brucia, morphia, greatly diminished their intensity of action, and change its mode. Thus, strychnia is made to paralyse, instead of inducing spasm.* These interesting researches indicate the direction in which physiological chemistry will advance. It is plain that we must give a wider meaning to the term chemical affinity, if there be truth in the theory I propose. For it not only regulates those changes in the velocity and direction of motion in space with which the science of dynamics deals, but also increase of molecular weight correlatively with successional changes in time, in which evolution of structure and function advance with evolutional integration of molecules,

* *Trans. Royal Soc. of Edinburgh*, vol. xxv. part i. p. 156.

increase of molecular weight, and accumulation of kinetic and regulative or constitutive energy. This dual energy of chemical affinity has not had distinct recognition. Dialysis is that process by which bodies are separated from each other when in mixture; analysis and synthesis indicate those processes by which molecules are disarranged and then rearranged; but there is no name for the combination of these processes in evolutional series to ends, from the simple to the complex, and the coincident accumulation and conservation of Energy which is of the essence of bio-chemical Energy and vital force. The word *diathesis*, from *diatithemi*, I arrange, would best express their entire process. It is, in fact, already in use to indicate a law of nutritional organisation, viz., the tendency to particular kinds of nutritional changes in individuals, and therewith to special diseases of tissues, as gout and scrofula, termed habit and constitution.*

288. This accumulation and conservation of Energy points to the more general cosmic law of the conservation of force already noticed (117), and leads direct to the hypothesis that the evolution-theory is applicable to the molecular forces themselves, and in particular, that chemical affinity is an evolved force. If it be true that harmonious *rotation* is the primordial mode of motion, then there is a correlative force. In nature this force is solar and cosmic. Light and heat are motions derived from the sun as a rotating body; magnetism, and its correlative galvanism, are motions from the rotating earth; so that it seems to be only the enunciation of a simple truth to say that the planetary and cosmical forces are evolved into molecular and vital forces. The rela-

* See this suggestion in Author's "Contributions to a New Chapter in the Physiology and Pathology of the Nervous System," *British Medical Journal*, 2d March 1868.

tions of these to Life and organisation have yet to be investigated scientifically. Although we may not be able to hold with the mesmerists that the human body is a magnet, there are facts which prove the nervous system is influenced by terrestrial magnetism, by an Energy derived from the great magnet men dwell on. It is ascertained that there are three kinds of molecular Energy, in a solar ray, viz., the luminous, the calorific, and the chemical. Guided by the doctrine of the correlation of forces, chemists have carefully investigated the relations of heat and motion, as manifested in the kinetic and calorific properties of nutritive compounds of oxygen, nitrogen, carbon, and hydrogen, considered as flesh-formers and heat-producers, but they find no sufficient uses in the organism for those nutritive salts compounded of phosphorus, sulphur, iron, potassium, calcium, iodine, chlorine, &c., which are found so necessary to all life, whether vegetal or animal, as to become in constant demand for the purposes of agriculture. Yet, at least, the two first are in such intimate relation to light, and all to the vital forces, that every theory of organic chemistry must of necessity be wholly imperfect that ignores them.

289. *Vital Force and Vis nervosa.*—It may help the solution of these problems to note here that the essential property of all living tissues is the regulative property in adaptation to ends (100, 101). So that although the brain and nerve-tissues manifest this property as a special function in regulating the transference of Energy, and unifying the multitudinous parts of an organism, they only manifest it according to the law of special differentiation with higher evolution. Phosphorus enters more especially into their composition, and also into the composition of their analogue, the sperm-cell. According

to the law of coincident increase of molecular energy with increase of evolution, these tissues must possess the largest amount of diathetic force. Now, it is precisely in these qualities that the *vis nervosa* is to be distinguished from all other forces. It is this which regulates not only voluntary motion, but all the processes of nutrition. Yet, although derived from a special tissue, it is only special by differentiation of structure and function. Since, therefore, *vis nervosa* is not other than an evolution of vital force, it is deducible from these considerations, that the true correlative of the vital forces is chemical affinity, considered as both a constitutive and regulative force (191), and that, consequently, the solution of the most fundamental problems in life, and organisation and consciousness, depends upon a knowledge of the laws of complex combinations of atoms to ends, as well as of the law of motion, included under dynamics.

290. *Vital Affinities.*—Chemical affinity causes the chemical integration of related molecules; the integration of the sperm-cell and germ-cell of sexual organs, so as to constitute a primordial cell, may be attributed to *vital affinity* (283). The bio-chemical changes, which coincide with the intimate union of the two molecules, are all evolutional. When the sperm-cell or granule, with its highly diathetic elementary body, phosphorus, comes into contact with the germ-cell and its sulphur element, both undergo—under the condition of a certain temperature—an active change in their molecular arrangements, and the primordial cell is the result. This is stable until the farther application of heat (as incubation), when another series of changes begins. Cells or granules are produced by repeated division (Dichotomy), and finally integrate into a tissue (germinal membrane) out of which the various particular tissues and organs of

the body are successively evolved, according to the process termed Differentiation. This evolution does not cease at the stage termed Birth, but is continued onwards until the organism attains to the perfection of which it is capable, and which is marked by the capability to produce sperm-cells and germ-cells (Puberty). Now, it is of fundamental importance to note the fact, that this vital affinity depends upon the condition that the two cells respectively shall be derived from organisms, evolved according to the same archetypal idea, or, physiologically, must belong to the same species (266). There is thus a vital affinity between the two cells. When this is not present, as is the case when the generative cells of animals of *different* species are brought into contact, there is no teleorganic change set up, and no sequences of phenomena begun.

291. It is, however, to be noted, that this vital affinity as to species is modified by the same law of duality as chemical affinity (283), and the principle of vital *elective affinity* modifies the results. It is well known that some, if not all, hermaphrodite animals cannot impregnate themselves. Mr Darwin has demonstrated the operation of the same law in plants. Common flax has two kinds of flowers, with complete sexual organs; but the pollen of one kind is absolutely inert when applied to its own stigma, although invariably potent when applied to the stigma of the other flower. Yet there is no discoverable difference between the two kinds of flowers.* Mr Darwin's investigations into the fertilisation of the common loose-strife (*Lythrum salicaria*) are still more remarkable. He found this to be trimorphic, having three kinds of flowers, all annually produced in abundance, but as different as if they belonged to different species, and each

* *Journal of Linnean Soc. of London*, vol. vii. p. 69.

lower having three kinds of stamens, differing in form and formation, so that there are six kinds of sperm-cells, of which at least five are essential to complete fertility.* Mr Darwin's researches into the fertilisation of the orchids, and of the primrose and cowslip, show how various are the contrivances for securing this affinitive duality. As to the orchids, he ascertained that the same plant is never continuously fertilised by its own pollen, and that there are special provisions, by means of insects, for impregnation by diversity of pollen, and thus securing the crossing of individuals. The teleology of floral æsthetics is also well illustrated by Mr Darwin's simple fact, that all plants with conspicuously coloured flowers, powerful odours, or honeyed sweets, are fertilised by insects. The same general law of elective affinity or affinitive duality is manifested as to the same æsthetic elements in insects, fishes, birds, and man, but with the addition of sounds to colours, odours, and form. This law is obviously operative in certain sexual affinities of man, as when preference is given by a fair-haired person to a dark-haired. It is also the law of "love at first sight," and of sexual preferences of the same kind in lower animals. The cause of these preferential impulses to sexual union, are certain mystical affinities induced by impressions made by the complexion, form, gait, voice, expression, or other characteristics of the individual, and which, since they determine the elective preference, may be named affinitive impressions. All amatory literature and poetry, and all the mystical theories of love, are full of this doctrine of elective affinity (395, vol. ii.).

292. *Affinitive Impressions and Susceptibility.*—No molecular changes take place in any matter whatever, unless Energy of some kind, as motion, be communicated

* *Ibid.* vol. viii. p. 160.

to it. In those which constitute vital changes, the amount of motion induced cannot, as we have seen, be estimated by foot-pounds, since it is due to a regulative or diathetic force. It is equally certain that the Energy itself, as motion, must be of a like kind, and derived from molecular matter moving under similar energies. And since there is an infinite variety in the molecular composition of organisms, so also there is as infinite a variety in the energies or motions which are in teleological relation, whether they reach the organism from without or arise within it. These adapted excitors of change are commonly termed *impressions*. The essence of an impression is, therefore, not only force or energy as a motive impulse, but energy or motion of such a kind that it disturbs sufficiently the constituent molecules of the recipient organism or tissue, so that certain molecular bio-chemical changes result, and therewith corresponding adaptations of structure or states of consciousness in connected series (301). The motions constituting the impressions must be in affinitive relation with the tissues, and hence they may be termed *affinitive impressions*, to distinguish them from energies acting on the organism without such results. The vibratory or undulatory motions upon which the perceptions of distant objects and sounds depend, are thus in affinitive relation as impressions with the senses of hearing and vision, and through them with all that part of the encephalon which enables man to feel and think as to objects whence sound and light come. And this law applies to all the so-called vital *stimuli*.

A special characteristic of these affinitive impressions is the small amount of energy, measured in foot-pounds, which is communicated, when compared with the results achieved. The slightest motive impulse derived, as

sounds, or as reflected light from objects in teleological relation, is sufficient to excite series after series of associated changes throughout the nerve-centres, giving rise to every variety of adapted acts and of conscious states. So also with regard to those poisonous chemical agents which act with varying intensity in different animals, or upon different nerve-centres and nerves. The theory of accumulative energy suffices to explain this peculiarity. But these nervous apparatus are not only constituted chemically so as to manifest the largest amount of "chemical tension," to use a term adopted by Dr Broadbent in explanation of the phenomena,* but are provided with a mechanism expressly fitted to intensify the motions that constitute affinitive impressions, or to moderate them. This is admirably shown in the organs of both hearing and vision, as to which we know certainly that the impressions are vibrations, are waves of pulsations, and that, when æsthetical, they recur in harmonic ratios.

293. *Affinitive Evolution.*—What is termed the *nature* of an organism is determined by the extent of adaptation to variety of affinitive impressions. These increase and widen in proportion as the organism is evolved, so that the widest adaptation to the greatest variety constitutes the highest perfection of nature. Plants have the least and lowest. They are mainly adapted to the impressions of radiant heat and light—the primary impulses to all vital processes. Then, in order, come those of matter in contact with the recipient structures and undulating pulsations of the air. In animals these are more complex, because the adaptations are to evolutional things, and the affinitive external impressions are, there-

* "An Attempt to apply Chemical Principles to the Action of Remedies and Poisons, *Jour. of Anat. and Physiol.* Nov. 1868.

fore, more complex and varied. They may all be resolved, however, into affinitive energies, communicated to an apparatus adapted to put into activity an adapted series of internal energies, which in their turn become affinitive internal impressions in evolutional series, with corresponding increase in complexity of molecular and mechanical organisation. In this way Life and organisation go on, and the manifestations of the great law of design in Thought, and of all its derivative laws, coincide with the evolutional chemical organisation. The adaptations thus effected of the various parts of an organism to each other and to external conditions, as energies or sources thereof, without consciousness, constitute the phenomena of Life or Existence simply; the like adaptations to the external world and to its affinitive impressions, with or without self-consciousness, more especially constitute the phenomena of Instinct. But if consciousness be superadded to these, then sensation, feeling, and thought coincide in higher and higher evolution with the higher molecular organisation, until the processes become more and more transcendental as the encephalic tissues become more evolved, more susceptible, and more capable.

294. Evolutional increase in both diathetic Energy and affinitive susceptibility (290), is the chief characteristic of the brain and the tissues generally in civilised man, and coincides with all those mental developments and social relations which constitute *civilisation*. The highest evolution, known as *refinement*, is a *quasi* morbid increase of both in persons of culture, little exposed to the hardships of life, and developing excessively the sensory part of the brain by indulgence in pleasures and luxuries. These persons are characterised by a greater corporeal susceptibility to the action of injurious agents of all

kinds, and more especially of those which act on the brain and nerves. The greater susceptibility and higher chemical evolution of the latter are shown by the readiness with which affinitive impressions act on the senses and the imagination, thus developing that excessive transcendentalism which shows itself in homœopathy, mesmerism, spiritualism, mystic æsthetics, as ritualism, and in all the varied forms of mysticism manifested in religious and ecclesiastical societies. It is enough to trace the same modification of vital processes, *mutatis mutandis*, in domestic and pet animals, and even in the highly cultivated plants, to be assured that some such general causes are at work. A defective supply of nutrient salts seems to be one of these causes (*ante*, p. 27). Civilised and refined man so prepares his food that he deprives it of part of those elementary constituents that are necessary to all vital activity, whether of plants or animals, so that there is a diminished supply to the tissues chiefly of phosphorus, sulphur, iron, potass, and iodine. The atmosphere of large towns also affords a less supply of oxygen and ozone in a given time. Add to all this the feverish activity of life in large cities, and the consequent more rapid consumption of the nutrient salts (especially of the phosphates), and of oxygen, and it is clear that these are conditions sufficient to change adversely the chemical constitution of the brain and the tissues generally. And this conclusion is confirmed by the fact, that all exhausting diseases and causes of exhaustion, but more especially of the brain and the nervous system, tend, in the first instance, to induce a morbid susceptibility.

SECT. III.—*Evolution of Teleiotic Ideas as Mental Faculties.*

295. *Intuitions and Intuitive Ideas.*—In life and organisation we note two parallel and coincident things, namely, the idea and its realisation (156, *sqq.*). The realisation is either phenomenally in time and space, when the idea is manifested to the sense in its results, as the phenomena of life and action, and we perceive them; or it is noumenal, when the idea is manifested directly to the consciousness, and we feel its results in the organisation—as thought, feeling, and the like. The two kinds of realisations are usually conjoined, and constitute those modes of vital energy termed the Will and the Mental Faculties. The energy, considered as a cause, has been variously named in accordance with the opinions held as to the nature and origin of the phenomena, but always by terms that indicate a law common to all, viz., that the manifestation of these energies as faculties is not due to experience and education. Hence the phenomenal manifestation has been termed instinctive, innate, heaven-born, a *quoddam divinum* (72–74), and natural (194). In like manner the word transcendental has been used (first, I think, by Kant) to designate the noumenal manifestations as intuitions and notions, meaning thereby to indicate that they are before and superior to experience. These intuitions and notions become in their turn derivative causal ideas, and the correlative phenomenal energies are mental faculties.

296. *The Knowing Faculty.*—I have already shown that intuitive ideas and necessary truths, although intimately connected, are different in their origin (*ante*, p. 287). A fundamental intuition is essential to the attainment of truth, because there can be no mental activity

without the correlative causal idea; but a truth implies an act of perception, whereby we recognise the agreement of the intuitive or noumenal manifestation of the teleiotic idea with the phenomenal. So that an intuition only becomes a truth when its agreement with the observable order of nature is ascertained. The fundamental intuition of truth (171) correlates this perception of the agreement, and is manifested as the desire to discover the order of nature and as the energy to know. It may be termed the instinct or energy for verification (462). It is the fundamental energy of the knowing faculties. When the fundamental intuitions are thus verified, they constitute the fundamental truths of the sciences (464). It is thus that intuitive perception of truth so often precedes inquiry in scientific investigations, and sometimes so accurately that it is termed Inspiration.

297. *Mystical Intuitions.*—These are transcendental intuitions, the agreement of which with the order of nature, being beyond the grasp of experience, cannot become scientific truths, and as to which man must therefore remain in doubt. But the intuition of truth is felt equally with regard to these as to other transcendental ideas, and the man energises to discover the order of nature that correlates them. These unproven or unprovable intuitions are those termed *mystical*, and are the fundamental ideas of all the "occult" sciences which profess to deal with the *arcana* of nature, and of all kinds of mystical systems in theology, philosophy, and science. They differ, accordingly, as the intuitions deal with material or with mental forces. The one class starts from the intuition of a unity of elementary atoms and forces in the universe; the other from the intuition of an independent force or cause in our bodies wholly different in its nature from these forces and from "matter" (*ante*, p. 117). Both

these intuitions may be true, and perhaps are true, but both are equally unprovable; the former because Man cannot include the universe as a whole in his range of observations, the latter because he can only verify it by ceasing to exist. Another class of this kind includes the element of time, infinite or indefinite,—as to the past, impelling to the vain search into the origin of things—as to the future, to the search into their destiny. The truth which correlates these fundamental intuitions is deduced from the agreement of the noumenal with the phenomenal, as they are manifested in encephalic tissues and in consciousness (87, *sqq.*). Of all these the intuition of the spiritual is the most important. Doubtless as to this it may be pertinently asked, Can you prove that mind or soul does *not* exist and act independently of organisation? to which the obvious reply is, Can you prove that it does? The spiritualists offer alleged proofs abundantly, but they never permit and carefully avoid scientific verification, while all experience repudiates the hypothesis of materialistic ghosts (p. 99). The sentiments which correlates these intuitions are those of wonder, awe, and the like. It is of importance, however, to distinguish between the absolutely and the relatively unprovable intuitions—those which we cannot grasp by experience for want of means, and those which no conceivable means could reach. Many truths are held to be mystical by the ignorant, prejudiced, and inexperienced, both amongst the vulgar and the learned, which are so held because of ignorance, prejudice, and inexperience. In this way discoverers live before their time, *i.e.*, before their truths can be understood and appreciated.

298. The energy for verification with its correlative of doubting is developed in proportion to the scope of the fundamental ideas which correlate the intuitions and

to the conviction of their truth. In excess it is termed *Enthusiasm.* Unity, duality, affinity, and multiplicity or infinity, are the most common combinations in these mystical systems, and the Energy aims at the realisation of them in speculative philosophies of whatever kind, and in the organisation of social systems. Sometimes the cosmic and mental intuitions are united in the same individual, as in Swedenborg, who tried to rival Newton in his "*Principia*," and to unveil as a prophet the secrets of the future world. The attempts to verify have sometimes established new truths of science. In this way the Hermetic philosophy laid the foundation of chemical science; and it may be said that mental science has received its most powerful impulse from the mystic phenomena of mesmerism and its congeners. Like all fundamental ideas, these mystical intuitions are evolved and manifested as the casual ideas, not only of systems of thought, but of action, and thus develop correlative societies and even nations.

299. *Atavistic Intuitions.*—The reproduction of ancestral mental activities (301), or the memory of the family and race, seems to be at the basis of a class of intuitions largely commingled with the mystical and transcendental. It is not uncommon for persons to have intuitions as of a past, or another state of existence, which cannot be traced to forgotten experience, and to manifest the operation of ancestral intuitions and intuitive faculties. These, in so far as they do not belong to the experience of the individual and are unprovable, are to be classed with the mystical; but they are sometimes capable of proof by retrocedent inquiry (history). I have designated them *atavistic.* The influence in individuals of this class of intuitions could, I think, be traced in the mental character of my late friend and colleague Professor Goodsir, and they

seem to be manifested in the labours of another equally eminent member of the scientific circle. It is, however, in the evolution of language (as among the Pagan races) and in the ancient traditions of nations, that this *atavistic* transmission of mystic intuitions is most strikingly shown. An archaic Paganism has in this way radically modified the evolution of Christian science and ethics. Their influence on language and on religious rights and ceremonies is well shown in an interesting, learned, albeit too enthusiastic a work by Dr Inman.*

300. *The Imagination.*—The state of consciousness termed imagination is due to a vital Energy in and by which there is a representation to the consciousness of a series of associated ideas or notions, so that they become objects of perception. The faculty which represents these perceptions to the senses by signs, symbols, or otherwise, is termed Execution. The ideas thus developed may be either those of reminiscence or of anticipation, and in either case may be classed as experimental or transcendental (295). Transcendentalism in art is the desire to realise artistic ideals. These are based on intuitions which are not necessarily either unprovable or unproved. The ideally beautiful may be tested by geometry (244, 245), even although the ideal be not realised in nature, which in truth it rarely is. By this criterion the beautiful is distinguished from the pleasing —two things essentially different, although confounded by the best writers. The pleasing may be, in fact, absolutely ugly, and often is. This law of the beautiful was well known to the ancient Greeks, for it is explicitly stated by Plato in "Philebus." I quote from Poste's translation, as given by Mr Dallas in his discussion of

* *Ancient Faiths embodied in Ancient Names*, vol. i. 1868.

this question.* "By beautiful figures I do not mean what the mass of men might imagine—animal shapes or painted forms; but straight and curved lines, says my theory, and the planes and solids they generate with turning lathes, and rulers, and goniometers, if you understand. These have not a relative beauty, like other things, but are eternally and intrinsically beautiful, and attended with pleasures of their own to which those of scratching [from titillation?] have no resemblance. And I refer to colours of a similar kind." It is precisely in this generalisation of colours, sounds, and forms under the same geometrical laws of æsthetics, with the same use of the goniometer, that the merit of the late D. R. Hay's theory consists—laws of the eternally and intrinsically beautiful

Mr Dallas has evidently not realised the full meaning of Plato's or Hay's doctrines, for he observes elsewhere:—"What is the relation of the parts, one to another, that constitutes beauty—why this relation of parts is beautiful, and not another—what is the harmony that exists between our minds and the objects we call beautiful, we know not.†" The geometrical evolution of the human form is seen equally in a Venus de Medicis, or in a perfect female homo, and the geometrical relation of the parts can be determined by the goniometer (as affirmed by Plato). The artistic intuition or ideal is the correlative of this archetypal evolution, just as the intuition of the *Ego* or I is the correlative of the unity in development of the organism. In such an intuition all the other teleiotic ideas are potentially included, and are actually manifested as duality (symmetry), variety, and infinity. (See § 505, vol. ii., where this subject is further

* *The Gay Science*, vol. ii. p. 68.

† *Ibid.*, vol. i. p. 106.

elucidated.) To the due representation of all æsthetic intuitions the coincident faculty of Execution is required, even in regard to the conjoined teleiotic idea. Thus, infinite minuteness of execution is a faculty of the true painter. (Compare § 832, vol. ii.)

301. *Memory and Association of Ideas.*—The orderly sequence of ideas in "trains" and "associations" (30), running on independently of will and consciousness (31, 32, 42), which constitute thought and volition when a voluntary action is conjoined, coincide under certain conditions with such changes in the encephalic tissue, that the results of these changes as new notions, cognitions, and experiences, become potentially an element of the tissue. So that this process being completed, they can be subsequently brought again into consciousness in new trains and associations, yet with the perception or intuition of past time. The first stage of this process is known as the conservative and retentive faculty; the second, as the reproductive, constituting recollection or reminiscence (29). Usually the term memory is applied vaguely to the entire process, or to either part of it.

All experience proves that memory, whether it be retention or reminiscence, or both, is inseparably dependent on vital changes; but the physiological explanations hitherto given have been wholly unequal to the exigencies of the problem (34, *sqq.*), and at this moment advanced physiologists pronounce the phenomena inscrutable and mysterious. But, by taking a more comprehensive grasp of the subject, and looking for the biotic correlatives of these changes, we find that they can be brought under fundamental laws of life and organisation. The conservative or retentive faculty is manifested in that vital process, whereby the modes of

vital energy that are or have been realised in time and space, whether in plants or in animals, and whether manifested as energies, functions, or states of consciousness, are potentially conserved and retained in those particles of living matter out of which a new organism is evolved, whether they be germs, pollen, zoids, zoospores, spermatozoa, or primordial cells. It not only secures the conservation and retention of the type, but of all those departures from it induced by the adaptation of the parent organism to new external conditions, so that special hereditary tendencies and new instincts are developed, as well as new species and varieties. In short, it is the process which lies at the foundation of the Lamarckian and Darwinean hypotheses. This most fundamental vital process has received no name, neither has it been considered, so far as I know, in its relations to memory and thought. It requires to be named. I propose, therefore, to designate the general process by the term *synesis* (a classic Greek word), and, adjectively, *synetic*. As manifested in tissues generally, it is *biotic;* in the sperm- and germ-molecules and in protoplasms, *genetic;* in the brain and its centres, *encephalic;* or, as the Greeks distinguished the retentive faculty from the reproductive by the term *mnēmē*, the encephalic class of changes in relation with consciousness may be properly termed *mnemonic synesis*.

302. One great difficulty in the way of comprehending the connection of memory with vital changes is obviated by these views, viz., that of conceiving how these subtle mental phenomena could be connected with matter at all. The mnemonic potentialities of the genetic cells and the primordial cells not only enable us to do this, but afford a glimpse of the law. Matter is absolutely essential for the completion, transmission, and reproduction of

these synetic changes, whether in plants or animals, yet it is so small in weight and in volume, as to be no more than a mathematical "point." The essential molecule of the human sperm-cell is about $\frac{1}{6000}$ inch wide, and one thousand human ova, even with the conjoined nutrient matter, weigh only about one grain. We can thus understand the immeasurable potential capacity of the molecules or cells of the human brain. It is a not less instructive fact that the sperm-cell of man is smaller than that of any of the other vertebrata, even of the smallest; and when size of organism be considered, almost inconceivably smaller than those of the lowest, and also the smallest.* These facts point to the singular conclusion that concentration of diathetic energy is correlative with complexity of evolution (287), so that although size of brain must be in relation with power of thought and memory, it is deducible from these facts that intensity of energy is as important a factor in the estimate of mental vigour. Chemical composition correlates the latter in both its genetic and encephalic *synesis*, but differently in the two classes of genetic cells or granules. The sperm-granules (spermatozoa) of man seem almost identical in composition with brain.† The germ molecule has not been isolated from the nutrient matter with which it is associated, and which is never found combined with the sperm-cell. This points to a difference in both function and diathetic constitution, and corroborates the idea of the ancients, which lead to matter being designated *materia*, or from the *mater*. The composition of the sperm-cell enables us to comprehend why spermatorrhœa and sexual incontinence affect

* Art. *Semen*, in *Cyclop. of Anatomy and Physiology.*

† *Frierich's Analysis.*

the memory and other mental energies, and enfeeble the brain.

It is an important fact that this concentration of energy is seen also in the blood-corpuscles, concurrently with higher evolution. Those of the higher vertebrata have no nuclei as have those of the lower, while they are more numerous and smaller in proportion to the general perfection of the organisation. Those of the human embryo are at first like the corpuscles of the invertebrate, and subsequently are the analogues of the lower vertebrate corpuscles.* These facts all point to the conclusion, that there is no relation whatever between the weight and volume of the primordial cell and the evolutional energy inherent in it, and plainly indicates the need there is for a further differentiation of the molecular forces (287), so that the regulative may be distinguished from the kinetic. The analogy of this retentive process, or mnemonic synesis, to the genetic synesis, may be extended to an explanation of the spontaneity of the higher encephalic processes; for just as the primordial cell is evolved under simple conditions of temperature and moisture, so the encephalic cells and molecules may undergo synetic evolutional changes with correlative thought and volition, independently of affinitive impressions, further than those which arise in evolutional and synetic sequences.

303. The converse biotic process of genetic *synesis* is the evolution and differentiation of the primordial cell or molecule. This is also the converse of the reproductive or reminiscent faculty, and of the processes which subserve to the evolution and differentiation of thoughts, ideas, and notions. *Synesis* having been established in

* See Mr Gulliver's Lectures on Blood of Vertebrata, *Med. Times and Gaz.* vol. ii. 1862.

relation with corresponding affinitive impressions (292), when the primordial cell is placed under similar conditions, the same, or rather similar affinitive impressions are received, and the parental series of vital energies and changes are reproduced in the offspring. In this way the two processes of *synesis* and parent-like evolution constitute the memory of the species or the variety. So also when encephalic or *mnemonic synesis* has been completed, whether in connection with volitions or thoughts, as a manifestation of the retentive or conservative faculty; if affinitive impressions similar to those under which the *synesis* was completed be subsequently brought into relation with the brain-tissue thus modified, there is analogous reproduction of the correlative vital changes, and evolution and differentiation of new encephalic changes in orderly succession, as reminiscences or not, coinciding with new trains and associations of ideas. Accordingly, as the new *mnemonic synesis* is perfected under the act of energy termed attention, or not (28), the synetic changes become the bases of latent states of consciousness (p. 174), or of unconscious cerebral action (61, 63, 65), with an *intuition*, but not necessarily a *perception* of past time. These reminiscences may be of *syneses* widely distant in time, or different in regard to consciousness. The reminiscences of *syneses* effected during sleep (*hypnotic synesis*), if reproduced to the consciousness out of relation to the affinitive impressions with which they originated, give origin to a large class of insane delusions and mysterious feelings. Or they may be reminiscences of *atavistic syneses;* for just as ancestral qualities of body and mind descend to offspring in successive generations, or are derived from ancestors through at least several generations, if not backwards *ad infinitum*, so may these mnemonic syneses descend. In this way are evolved a class

of *atavistic reminiscences* or recollections, which can have no relation to the experience of the individual, and must therefore of necessity be transcendental (299). Of course the fact is unproveable as to particular thoughts, but not as to *modes* of thought and will, which are indicated by style of handwriting, of composition, and of association of ideas, as expressed thereby. The reminiscence of the encephalic syneses of *childhood* are also of this class, only less distant in time. Often these are reproduced to the consciousness rather as of a dream than of waking realities. All these reminiscences have their correlative states of feeling as sentiments (488) and modes of energy.

For the sake of scientific clearness, and better practical application to healthy and morbid memory, it is needful to distinguish these mnemonic processes pyschologically by more exact designations. I have already adopted the word *memory* to express the whole faculty, *memniscence* to indicate the retentive part of the faculty, and *reminiscence* to denote the reproductive.* Both processes are under the same laws of evolution and retrocession, as all the other processes, and equally manifest evolution degeneration and decline (306).

SECT. IV.—*Vital and Mental Energies, in relation to Imperfection, Disorder, and Disease.*

304. The teleiotic idea of Perfection has its derivative ideas and correlative energies in life and organisation. The fundamental intuition, like all others of the class, is transcendental. The correlative cognitive energy is manifested in that incessant striving to know the un-

* Physiological Nosology of Mental Diseases, in *Principles and Methods of Medical Observation and Research*, 2d ed. p. 391.

known, which is man's chief characteristic, and is the pleasurable pursuit of truth for its own sake. In life and organisation the derivative ideas coincide with energies that aim at perfection by progressive evolution and advancement from imperfection. All that is ideally and biotically incomplete is imperfect, in relation to that which is ideally and biotically more complete, up to absolute perfection (285). Hence a group of correlative intuitions and ideas, comprising those of good and evil, order and disorder, beauty and deformity, youth and age, health and disease, and the like. The highest encephalic manifestation of these energies is the striving after an evolutional perfection of human nature, with the correlative intuition of a higher attainable perfection. It is the source of all those enthusiasms of which the motto is "*Excelsior*." Their fundamental intuition is necessarily mystical (297), inasmuch as it includes the notion of a future which both transcends and is unproveable by experience. As such it is the causal idea of all optimist systems of impracticable social organisations, whether political, philosophical, religious, or moral, and the source of energy of those enthusiasts who disturb order by their visionary schemes.

305. But the correlative teleiotic idea of imperfection out of which the intuitions of perfection arise, is part of the idea of perfection. For since the order of adaptation to ends is an unceasing evolution to higher perfection, an organism tends necessarily to decline and decay so soon as it ceases to evolve, so that the imperfect perishes as necessarily under these conditions as it evolves to a higher perfection under other conditions. The duration of life and of its successive stages is regulated by this law. From the commencement of evolution the organism becomes more and more perfect, until *genetic*

synesis constituting puberty, is established and the climax of perfection is reached. Then a series of changes commence, marking the decline from puberty, health, and vigour, to old age, decay, and death. It may be stated generally that the durations of the two processes are in relation to each other.

These views enable us to understand how far disease and death are true evils. It is usual to look upon death as an evil to be always avoided, and continuance of life to be aimed at by every rational man. Yet we thus learn otherwise; for since death occurs according to a fundamental law of our nature, it becomes, under appropriate conditions, as desirable as life. These conditions are either when weakness and pain are the result of bodily disease, or when, without bodily disease, there is that state of the brain morbidly induced that naturally results therefrom. Hence death is often earnestly desired as the greatest good, and, under states of pain, whether mental or bodily, is often as passionately and imperatively sought and desired as food, or water, or air. Thousands annually yield to this impulse and commit suicide. The act has two aspects—the social and the religious. In a social community the law is that no member's life is his own, but it is at the disposal of the community. Assuming, however, that it can allow a man to withdraw himself from duties he can no longer perform, suicide would then be no more immoral than any other legalised killing, as by the soldier or the executioner.

306. *Degeneracy and Disease as Retrocession.*—When an organism begins to decline, the changes which take place in the tissues, whether as to chemical constitution or structure, are the reverse of those of evolution, except that there seems to be a continuous, yet defective, evolution in certain structures, as age advances, so that carti-

lage becomes bone; otherwise there is retrocession to a lower type. In chemical evolution (287), for example, uric acid is a normal product of nutrient transformation in birds and reptiles, as urea is in man; but in various diseases of man, as in gout and fevers, it is a characteristic morbid product. Lactic acid, fats, and other products characteristic of disease and decline, are in the same category. It seems probable, too, that a similar law of retrocession of evolution (or *dis*volution) regulates the morbic development of the blood-corpuscles in those diseased states of the blood in which they degenerate into a lower normal type. This law of retrocession applies very strikingly to the encephalic tissue, when in the decay of the mental powers there is a return to the earlier *mnemonic syneses* (302), and infantile memories are manifested. Although encephalic *synesis* so completely fails that the individual cannot remember from hour to hour, he has reminiscences more vivid than ever of early life. In like manner, in certain kinds of brain-disease, in which there is failure of the executive faculties, the person will return to the drawing, handwriting, and even the spelling, as well as thoughts of his childhood. In delirium hallucinations and dreams the same retrocession is strongly manifested, so that long-forgotten things, or a forgotten language and events, are reproduced to the consciousness.

307. *Prolongation of Life.*—In all ages mystical intuitions as to perfection of health and the indefinite prolongation of human life have incited to the search after an *elixir vitæ*, or the moral perfection of human nature has been the aim. These intuitions vary according as the intuition of past or future time is dominant. The one class includes a mystical intuition of a past time, when man was perfect, corporeally and morally, and life

was indefinitely prolonged, with the correlative intuition that he has degenerated from this state of perfection. In the other are those based on a mystical intuition of a future time, when man will attain to this perfection, with the correlative idea that he has already passed through a series of stages of imperfection, and is being evolved with less imperfection. Both classes correlate laws of life, and are therefore probably both true. Man probably has degenerated; but man, as he now exists, is probably more perfect in some respects than in past time. The questions admit, to a limited extent, of scientific solution. The duration of human life is manifestly shortened by known preventible causes in at least five-sixths of all human beings born. To what extent it is shortened in the remaining sixth can only be estimated by comparison with the potential duration as a standard measure. Various attempts have been made to estimate it. The most recent is that of Flourens, who fixed it at one hundred years; but when the known causes of abbreviation are considered in connection with long lives like those of Parr, Jenkins, and others, it may be fairly inferred that the potential duration is greater than this, or than is attained or attainable under existing conditions. History, however, affords no scientific facts in proof of the alleged degeneration in man's length of life. All we have are traditionary. If the duration of life be in any sense correlative with æonic evolution of species, and coincident accumulation and concentration of vital energy (289, 292), then those animals that are the heirs of all the ages ought to have, other things being equal, the longest lives. So also, in proportion as man becomes more perfect in body and mind, the duration of life should increase. In this respect civilised man seems to have degenerated by not having advanced to higher per-

fection (305). And this law explains many of the evils of civilisation. Infertile marriages, due to imperfect genetic *synesis* (301), and the consequent abolition of capability of reproduction (such as marks the decline of life), the abbreviation of life in the weakly, and the destruction by those external conditions in respect to which adaptation fails, are seen more or less in all organisms that come short of perfect health, or cease to evolve to higher perfection. The law applies to nations and races as well as to individuals, so that it is by this law we can explain why aboriginal tribes and peoples sunk in luxury melt away before more civilised or more powerful races. It is the order of nature towards perfection.

307. The degeneration in form, due to arrest of development of the individual, or to retrocession to a lower archetype, are under the same law. Just as the cultivated varieties of plants and animals are apt by overculture to degenerate, so it is with man. There are idiots that are literally *theroid*, or like lower animals, in some particular, as to form or instinct, in virtue of this law of retrocession. Happily they cannot reproduce their kind, else a genus of anthropoid beasts would be the result. In like manner highly developed people will revert to lower ethnic forms, as to both osseous conformations and mental states.*

308. Mental and moral imperfections, in so far as they are dependent on encephalic health, follow the same inexorable law. It is by no means uncommon for high

* See these ethnic degenerations discussed, with illustrations, by the author, in his essay, "On the naming and classification of Mental Diseases and Defects," in *Journ. of Mental Science*, July 1863; also as to degenerations of the osseous conformations and of the nervous system, with illustrations, in *Med. Times and Gazette*, vol. i. for 1862, pp. 205, 287, 343.

mental and moral qualities to be evolved in an individual, and then when evolution ceases, for defect and degeneration to begin, so that the lower animal instincts become predominant, and the moral sentiments disappear. This constitutes *moral insanity* when manifested in healthy persons, and *moral imbecility* when congenital. These kinds of imperfection are so constantly associated with hereditary defect in brain nutrition, that there can be no doubt of their nature, or that their causes have originated in parents or ancestors. Over stimulation of the brain by fermented and alcoholic drinks, by opium, or other drugs of the kind, by excessive mental labour, by undue sensorial and emotional activity, whether religious, æsthetic, literary, or political, and by certain morbid conditions, more especially of the epileptic class, are of this kind. It is in the children of parents thus influenced as to cerebral nutrition, that that moral degeneration is manifested at puberty, which, as a moral imbecility, is displayed in a vicious activity, and which, therefore, almost always implies hereditary brain-defect.

If these facts be considered in the light of the great law of evolution to ends, the apparent contradiction to the law of hereditary transmission, when genius is the parent of folly, is intelligible. It is in accordance with that great law that a mode of vital activity once begun, shall go on evolving and differentiating to higher perfection; but it is equally in accordance, that a mode of defective brain nutrition once begun shall be evolved, as well as in the offspring as in the individual. As to the former, it is manifested more and more in successive generations, until (in about the fourth or fifth) the family dies out. These degenerations occur most commonly in the individual at those periods of life which are marked by perfection of evolution and decline, the

chief of which is puberty, and the next in order the climacteric period.

309. Puberty is well known to be the stage of the highest corporeal evolution; it is hardly recognised as the period of biotic mental and moral perfection, not only in man but in other animals. Old dogs and monkeys do not become irritable and savage from experience alone, but from the decline of the vital powers. It is not otherwise with man. The power of abstract ideation is evolved as puberty is completed, and the desire to know becomes a passion. The moral sentiments are also evolved, so that the innocence and generous enthusiasm of youth are proverbial. It is at ripe manhood that visions of noble enterprises float before the imagination, and resolutions are taken to make the world and the order of events more perfect. Age adds the mnemonic *syneses* of experience, and therewith the ability to fulfil these resolves; but it brings also the decay and decline, which dims both these visions and the glory of youth.

That this evolution of the moral elements of human nature, at puberty, has a purpose in the perfection of man, may be deduced from the physiology of "love at first sight." If the lovers be of cultivated minds, before the corporeal union is consummated, vague mystic feelings are experienced, which evolve variously, according to the sex and the encephalic constitution of the individual, into æsthetic, moral, and religious sentiments. Many such lovers pay their vows under the influence of ideal intuitions (301) in painting, poetry, or song. All the masculine virtues are more or less developed; all the best feminine sentiments are excited. Each thinks the other perfection, and in both, when the passion is perfect, is evolved the highest law and sentiment of Christian

morals, the love which leads to the abnegation of self. It is only when incontinent indulgence in amatory pleasures has induced that defect of brain-nutrition, indicated by the feeling of satiety, that these exalted sentiments become enfeebled, or are altogether abolished, and indifference or aversion takes the place of love. In all this, the purpose of more perfect reproduction of the species, which runs throughout the whole series of sexual organisms, from plants upwards, is clearly manifested. That love-begots are more vigorous than legitimate children is a popular opinion not without foundation in fact. The problem is, however, highly complex, for the reaction of the brain on the genetic cells of the sexes, and on the embryo in utero, may be for evil as well as for good. Although the mystical intuitions of perfection which characterise love at first sight, and "marriages made in heaven," probably tend to higher perfection of offspring, illicit love has its penalties of grief and despair, to the damage of the brain and the degradation of the offspring. To what extent emotional states of the mother of either class may affect the embyro, or the fœtus, has never been scientifically investigated, chiefly because those with the best opportunities and the most competent have looked upon the doctrine as mystical, and denied the truth of the various facts illustrative of maternal influence, on the fallacious ground that there is (to them) no conceivable channel through which the imagination of the mother could affect the *fœtus in utero*. These, as well as all other facts, however, tend to the conclusion, that perfect health of the mother—corporeal, moral, and mental—is essential to the perfection of human nature. And when we see how, through the whole range of sexual organisms, provision is made for the union of the most perfect of the sexes, without, I think, a solitary exception, it is reason-

able to conclude that the passionate preference, which is the characteristic of a genuine affection, is induced by elective affinitive impressions (291) derived from the object of preference, which indicate fitness for carrying on the perfection of the species. So that encephalic *synesis*, in a healthy encephalic tissue, under these exalted sentiments, will subserve to the production of a higher corporeal and moral type in the offspring.

310. The influence of these laws on the abnormal development of social man is manifested of late years in certain associations of the sexes under various fundamental intuitions. In certain organisations, with a natural tendency to the imaginative, mystical intuitions are developed at puberty, which guide the whole conduct of the individual in combination with the sexual impulse. In this way high moral and religious feelings evolved at puberty will lead the impassioned into wayward courses, and into societies of Free Lovers, Agapemones, spiritual marriages, and the like; or, under feelings of erotic disappointment, into religious celibacy. The chief characteristic of these eccentric evolutions of human society is the aim at a higher perfection. They are no novelties in the natural history of man, for the same law energised in the ancient Christian *Agapæ*, in the Eleusinian mysteries, and in the *cultus* of Venus, Ashtaroth, Baal, and other ancient deities. An interesting illustration of the evolution of this class of mystical intuitions and of correlative vital energies is afforded by the doctrine of celestial and natural affinities, to which Mr Hepworth Dixon devoted two chapters in his recent interesting work.* When Swedenborg wrote, the physiological processes of generation were quite unknown, yet in his theory of celestial life the mystical intuition of an inte-

* *Spiritual Wives*, vol. ii. pp. 187, 197.

gration or intimate blending of souls in marriage correlates the integration of the sperm-cell and germ-cell in the genesis of terrestrial life. It is only recently that the curious natural affinities displayed in the sexual union of plants have been revealed by the researches of Mr Darwin (291), yet Swedenborg's theory of natural pairs is founded on a mystical intuition of such affinities. Hence theconclusion, that in all these intuitions there is a hidden truth.

311. That high development of the intuitions and of the correlative faculties which constitutes "inspiration" and genius, points to the possibility of a more perfect man under more perfect conditions of health. For if all the intuitions and the faculties were developed harmoniously in a man, and to that perfection which we find single faculties to attain in born poets, painters, musicians, mathematicians, and others, human nature would not only be endowed with the highest intuitions, but also with an unerring instinct for the attainment of all that is good and beautiful and true. The possibility of appropriate chemical changes in the brain-tissue is proved by the action of drugs and of mesmeric and other influences, on the highest intuitions and executive faculties. The author has experienced an illustration of this conclusion in his own person. On a certain night, when a sufferer from severe pain and great weakness, he took one drop of Fleming's tincture of aconite, and slept. About midnight he became sensible of a novel state of perception, obscure at first, but shaped at last into strains of grand ærial music in cadences of exquisite harmony, now dying away round mountains in infinite perspective, now pealing along ocean-like valleys. Knowing by previous studies that it was a hallucination of perception, he at last listened to ascertain the cause, and found it was the

rattle of a midnight train entering an adjoining railway station. Thus, under the changes induced in the brain by a drop of tincture of aconite, the harsh rattle of the iron vibrating on the air in the silence of a summer midnight was changed into harp-like ærial music, such not only as "ear had not heard," but no conceivable art of man could realise. Associated therewith was also a suggested terrestrial vision of space of infinite extent and grandeur. But this fact also illustrates the chief difficulty in the current theories of evolutional perfection, for the development of these transcendental intuitions and their correlative faculties (300) is too often coincident with a *quasi*-morbid refinement due to defective brain-nutrition (294). For this reason it so rarely happens that genius is transmitted to offspring. What we ought to act on is the law of healthy, and therewith progressive evolution.

312. The ultimate manifestation of the intuition of evolutional perfection is that termed Faith. A true faith, although necessarily mystical, because the fundamental intuition is unproveable by experience, has some basis in truth, as for example in the doctrine of prophetic types (261), and in the fact that man *has* the intuition (161). The highest evolution of Faith, as *Religion*, is conjoined with other fundamental intuitions, as of cause and order (187), in the religious sentiments. None of these can be realised, so that there must always remain something unknown in the world of Life as well as in the great Kosmos, which man must struggle to know—something for his imagination and his faith to dwell upon. His view of creation being limited, he can never rightly conceive to what good ends those things which we call evil tend. It is here that Faith—"the substance of things hoped for"—begins. We have *intuitions* of perfection,

and of a more perfect state than the present, and we instinctively labour to realise them. Those intuitions are verities—dimly seen, it is true, but as firm as the intuitions of consciousness that we feel, and think, and know. Here, then, is a rational ground for the belief, that if we *could* know and comprehend the whole plan of creation, those things which we call imperfections would, under a higher generalisation, appear as perfections; and that, in relation to the grander and more comprehensive plans which we conceive so dimly, that which we now, with our limited powers, regard, and practically must by our very nature regard, as Evil, would be found to be very Good. Since the intuition of Perfection correlates the teleiotic idea of Perfection in created things, it is a necessary element of our nature, whether physical or moral. We cannot but feel it, therefore, when we contemplate created things with a knowledge of God's laws.

> . . . . . "I cannot go,
> Where universal love not smiles around,
> Sustaining all yon orbs and all their suns;
> From seeming evil still educing good;
> And better thence again, and better still,
> In infinite progression."*

If these principles, deduced from biological laws, be correct, it is plainly the duty of man to endeavour to attain to perfection of body and mind by searching out and strictly obeying those laws. The way of obedience has already, indeed, been concisely stated by a high authority on Christian duty. "Giving all diligence, add to your faith, virtue; and to virtue, knowledge (*gnosis*); and to knowledge, temperance; and to temperance, patience; and to patience, godliness; and to godliness, brotherly kindness; and to brotherly kindness, charity" or love—

* Thomson. *Hymn on the Seasons.*

that most excellent gift of all, as another equally high Christian authority designates it. Read by the light of biological science, this summary of Christian morals implies much more than the apostolic successors of the fisherman teach us. The order of evolution of the Christian system therein indicated has been broken off at GNOSIS or science, and hence that failure in the further development of Christian temperance, patience, godliness, brotherly kindness, and love, which this, its nineteenth century of life, exhibits. That order also points to the conclusion, that faith and science and morals are in such intimate relation as to constitute a unity, and are neither irrelative nor antagonistic, as some theologians maintain. To give science its rightful place in the Christian system, it will be necessary to clear away the archaic paganism (299) with which religion and morals are now encrusted in all lands. This must, therefore, be one of the chief objects of the next great reformation.

END OF FIRST VOLUME.

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